

ALAGAPPA UNIVERSITY



[Accredited with 'A+' Grade by NAAC (CGPA:3.64) in the Third Cycle
and Graded as Category–I University by MHRD-UGC]

(A State University Established by the Government of Tamil Nadu)

KARAIKUDI – 630 003

Directorate of Distance Education

B.Com.

IV - Semester

102 44

MANAGEMENT ACCOUNTING

Authors:

Prof. M A Sahaf, The Business School, University of Kashmir, Srinagar

Units: (1, 2, 4.2.1, 4.3.4, 7, 8, 10, 11, 12.0-12.3, 14)

M N Arora, Ex-Associate Professor, Department of Commerce, Hans Raj College, Delhi University

Units: (3, 4.2, 4.3-4.3.3, 5, 6)

Dr Sarbesh Mishra, Professor, NICMAR, 7-06, Jaganguda (V), Shamirpet (M), Hyderabad

Units: (9.0, 9.2-9.3)

Dr. Bhavesh Patel, Ex Professor, XLRI, Jamshedpur

Units: (9.4, 13.0-13.4)

Vikas® Publishing House, Units: (4.0-4.1, 4.4-4.8, 9.1, 9.5-9.9, 12.4-12.9, 13.5-13.10)



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VIKAS® PUBLISHING HOUSE PVT. LTD.
E-28, Sector-8, Noida - 201301 (UP)
Phone: 0120-4078900 • Fax: 0120-4078999
Regd. Office: A-27, 2nd Floor, Mohan Co-operative Industrial Estate, New Delhi 1100 44
• Website: www.vikaspublishing.com • Email: helpline@vikaspublishing.com

Work Order No. AU/DDE/DE12-01/Preparation and Printing of Course Materials/2020 dated 30.01.2020, Copies 600

SYLLABI-BOOK MAPPING TABLE

Management Accounting

Syllabi	Mapping in Book
BLOCK - I: INTRODUCTION AND STANDARD COSTING	
UNIT 1: Management Accounting - Meaning, Features - Scope - Importance - Functions - Differences between Financial Accounting - Cost Accounting and Management Accounting.	**Unit 1:** Introduction to Management Accounting **(Pages 1-14)**
UNIT 2: Budgetary Control - Meaning - Characteristics - Objectives - Steps - Advantages - Limitations - Types of Budgets.	**Unit 2:** Budgetary Control **(Pages 15-44)**
UNIT 3: Standard Costing: Meaning - Advantages - Limitations - Preliminaries - Steps in Setting Up of Standard Costs - Differences between Budgetary Control and Standard Costing - Estimated Cost.	**Unit 3:** Standard Costing **(Pages 45-58)**
UNIT 4: Variance Analysis - Meaning - Favourable and Unfavourable Variances - Controllable and Uncontrollable Variances - Uses of Variances - Analysis of Variances - Types of Variances.	**Unit 4:** Variance Analysis **(Pages 59-91)**
BLOCK - II: MARGINAL COSTING, FINANCIAL STATEMENT AND RATIO ANALYSIS	
UNIT 5: Marginal Costing - Meaning - Features - Advantages - Limitations - Absorption Costing.	**Unit 5:** Marginal Costing **(Pages 92-106)**
UNIT 6: Cost - Volume - Profit Analysis - Contribution - Break Even Analysis - Profit Volume Ratio - Margin of Safety.	**Unit 6:** Cost – Volume – Profit Analysis **(Pages 107-124)**
UNIT 7: Analysis and Interpretation of Financial Statements - Meaning - Steps - Objectives - Types of Analysis - Comparative Financial Statement - Common Size Financial Statement - Trend Analysis.	**Unit 7:** Analysis and Interpretation of Financial Statements **(Pages 125-142)**
UNIT 8: Ratio Analysis: Meaning - Advantages - Limitations - Classifications of Ratios.	**Unit 8:** Ratio Analysis **(Pages 143-167)**
BLOCK - III: WORKING CAPITAL MANAGEMENT, FUND AND CASH FLOW STATEMENT	
UNIT 9: Working Capital Management - Meaning of Working Capital - Kinds of Working Capital - Sources of Working Capital - Objectives of Working Capital Management - Determinants of Working Capital Requirement - Estimation of Working Capital Requirement.	**Unit 9:** Working Capital Management **(Pages 168-191)**
UNIT 10: Fund Flow Statement - Meaning - Uses - Limitations - Sources and uses of Funds.	**Unit 10:** Fund Flow Statement **(Pages 192-210)**
UNIT 11: Cash Flow Statement - Meaning - Uses - Limitations - Sources and Uses of Cash.	**Unit 11:** Cash Flow Statement **(Pages 211-229)**
BLOCK - IV: CAPITAL BUDGETING & DIVIDEND POLICY	
UNIT 12: Capital Budgeting - Meaning - Principles of Capital - Budgeting - Methods of Evaluating - Capital Rationing.	**Unit 12:** Capital Budgeting **(Pages 230-252)**
UNIT 13: Management of Profits/Dividend Policy - Meaning of Dividend Policy - Types of Dividend Policy - Factors Influencing Dividend Policy - Forms of Dividend - Dividend Models.	**Unit 13:** Management of Profits/ Dividend Policy **(Pages 253-269)**
UNIT 14: Overview of Latest Developments in Accounting - Transfer Pricing - Responsibility - Accounting - Inflation Accounting - Divisional Performance Analysis - Human Resources Accounting.	**Unit 14:** Overview of Latest Developments in Accounting **(Pages 270-305)**

CONTENTS

INTRODUCTION

NOTES

Accounting plays a crucial role in the functioning of an organization. It not only helps in enhancing decision-making capabilities, but also facilitates the efficient utilization of resources. Organizations across the globe operate in a highly dynamic and complex business environment, in which managers need relevant and current information to aid them in decision making. Accounting must respond to the changing needs of the decision-makers in order to justify its relevance in contemporary business. In fact, the significance of financial information has always been recognized, but in the present business scenario, such information has become a resource parallel in importance to factors of production.

To explore and utilize the financial information generated by the accounting system of an organization for competitive advantage, managers must have a fair knowledge of the tools and techniques that they can use for analysing and interpreting the available information. Both the prerequisites of effective decision making-financial information and analytical techniques-are covered under Management Accounting, which involves the study of accounting information and techniques that managers use in analysing such information.

This book, *Management Accounting*, is written with the distance learning student in mind. It is presented in a user-friendly format using a clear, lucid language. Each unit contains an Introduction and a list of Objectives to prepare the student for what to expect in the text. At the end of each unit are a Summary and a list of Key Words, to aid in recollection of concepts learnt. All units contain Self-Assessment Questions and Exercises, and strategically placed Check Your Progress questions so the student can keep track of what has been discussed.

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BLOCK - I
INTRODUCTION AND STANDARD COSTING

UNIT 1 INTRODUCTION TO MANAGEMENT ACCOUNTING

Structure

1.0 INTRODUCTION

Accounting information is becoming increasingly critical to the continuing success of an organization. With the growing importance of information as a resource, organizations have felt the need for a system that is capable of managing this resource efficiently. This is, perhaps, the basic reason for business students to study the anatomy and operation of the accounting system, which provides information to managers for decision making.

Modern accounting as a dynamic and growing field is emerging as a strategic weapon that is helping to shape the direction and growth of organizations in the changing business environment. However, to explore and utilize the financial information generated by the accounting system of an organization for competitive advantage, managers must have a fair knowledge of the tools and techniques that they can use for analysing and interpreting the available information. Both the prerequisites of effective decision making—financial information and analytical techniques—are covered under *management accounting,* which involves the study of accounting information and techniques that managers use in analysing such information.

1.1 OBJECTIVES

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After going through this unit, you will be able to::

- Explain the meaning and features of management accounting
- Discuss the scope, importance and functions of management accounting
- Describe the differences between financial, cost and management accounting

1.2 MANAGEMENT ACCOUNTING: MEANING, FEATURES AND SCOPE

Management accounting is a segment of accounting that deals specifically with the analysis and reporting of information to management about the operations of the organization with an objective to facilitate decision making. On the one hand, management accounting aims to provide adequate financial information to managers for decision making and on the other, it is oriented towards managerial control. Management frequently requires timely financial information concerning different aspects of the organization, ranging from special purpose report of a specific department's operating performance to the preparation of annual budgets and forecasts, which encompass the entire business.

The term 'management accounting' was first formally mentioned in 1950 in a report entitled '*Management Accounting*', published by the Anglo-American Council of Productivity Management Accounting Team after its visit to the United States in the same year. The team in its report defined management accounting as '*the presentation of accounting information in such a way as to assist management in the creation of policy and in the day-to-day operation of an undertaking.*'

Thereafter, a number of attempts have been made by various professional bodies and associations to define management accounting in its right perspective.

All the definitions place emphasis on the information processing and decision making aspects of accounting. The analysis of the definitions further reveals that the system of management accounting is not designed to appraise and monitor the past performance of individuals and groups but to assist managerial decisions affecting the future. Thus, management accounting is a system for gathering, summarizing, reporting and interpreting accounting data and other financial information primarily for the internal needs of management. Thus, *management accounting is a system capable of generating accounting information that assists internal management in the efficient formulation, execution and appraisal of business plans that help the organizations* to *achieve their strategic objectives*.

NOTES

Thus, management accounting in addition to helping managers in the decision making process, facilitates them in intra-firm resource allocations, fixation of responsibilities and the evaluation of future policies and strategies. All this brings to light an important fact—that management accounting has to perform two separate, distinct functions of financial and management reporting and that the data needs for each are often different. Few intelligent financial and economic decisions can be made in the absence of that information reservoir. Involvement with both time dimensions, past and future, places the executive near the centre of the control and decision making processes in any organization.

Features of Management Accounting

It is clear from the above definitions that management accounting is concerned with accounting data that is useful in decision making. The main characteristics of management accounting are as follows:

1. **Useful in decision making:** The essential aim of management accounting is to assist management in decision making and control. It is concerned with all such information which can prove useful to management in decision making.
2. **Financial and cost accounting information:** Basic accounting information useful for management accounting is derived from financial and cost accounting records.
3. **Internal use:** Information provided by management accounting is exclusively for use by management for internal use. Such information is not to be given to parties external to the business, like shareholders, creditors and banks.
4. **Purely optional:** Management accounting is a purely voluntary technique and there is no statutory obligation. Its adoption by any firm depends upon its utility and desirability.
5. **Concerned with future:** As management accounting is concerned with decision making, it is related with future because decisions are taken for future course of action and not the past.
6. **Flexibility in presentation of information:** Unlike financial accounting, in management accounting there are no prescribed formats for presentation of information to management. The form of presentation of information is left to the wisdom of the management accountant who decides which is the most useful format of providing the relevant information, depending upon the utility of each type of form and information.

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Scope of Management Accounting

Traditionally, the subject matter of management accounting mainly consisted of financial statement analysis and costing theory. As organizations began to operate in a highly dynamic and complex business environment, they realized that the existing subject matter of management accounting was insufficient to meet the challenges of the changing environment. To address the emerging challenges, management accounting enhanced its scope by including in its ambit many frameworks, tools and techniques borrowed from other disciplines such as economics, finance, mathematics, statistics and operations research. The contemporary subject matter of management accounting is summarized below:

Financial Accounting: Financial accounting is a prerequisite for any discussion on the subject of management accounting. Financial statements as generated by financial accounting contain enough data that is converted into information by organizations and used in their decision making. In fact, management accounting provides only tools and techniques for interpretation and analysis and the management accountants get the data for the purpose mainly from financial accounting. Thus, management accounting cannot exist without efficient financial accounting system.

Cost Accounting: Although managers generally use financial information in decision making, they often supplement their decisions with cost information as they have realized that any activity of an organization can be described by its cost. They make use of various cost data in managing organizations effectively. In fact, cost accounting is considered the backbone of management accounting as it provides the analytical tools such as budgetary control, standard costing, marginal costing, inventory control, operating costing, etc., which are used by management to discharge its responsibilities efficiently.

Financial Statement: Analysis Managers frequently use information based on the data collected from financial statements. This information can be obtained either by selecting individual numbers from the statements or by developing certain trends and ratios. Any attempt in this direction is referred to as financial statement analysis. The analysis and interpretation of the data contained in financial statements can provide a reader meaningful insights and conclusions about the organization. Over the past few decades, numerous techniques have been developed which are useful for the proper interpretation and analysis of financial statements.

Budgeting: Budgeting, which lies at the heart of management accounting, refers to a systematic plan for the utilization of organizational resources. As a management tool, budgeting aims to coordinate and integrate the efforts and activities of various departments with the cooperation of those who seek to achieve a common goal. In fact, the organizations exercise their operational control through the budgets prepared in advance for every major activity of the business.

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Inflation Accounting: Inflation accounting attempts to identify certain characteristics of accounting that tend to distort the reporting of financial results during periods of rapidly changing prices. It devises and implements appropriate methods to analyse and interpret the impact of inflation on the business transactions.

Management Reporting: Clear, informative and timely reports have always been recognized as managerial tools in reaching decisions that not only help the organizations to improve their performance but also make the best use of their resources. Thus, one of the basic responsibilities of management accounting is to keep the management well informed about the operations of the business. To discharge this responsibility efficiently, management accounting needs to prepare quarterly, half-yearly and other interim reports and submit the same to the management.

Quantitative Techniques: Many managers recognize that the financial and economic data available for managerial decisions can be more useful if analysed with highly sophisticated techniques of analysis and evaluation. Such techniques as the subject matter of quantitative analysis allow managers to create information from their financial database that is not, otherwise, available. In addition to the techniques like time series, regression analysis and sampling techniques, the managers also make use of linear programming, game theory and queuing theory for this purpose.

Tax Accounting: Since taxation plays an important role in the profitability of a commercial organization, it is essential for a management accountant to have a complete knowledge of business taxation. The business profit and the tax thereon are to be ascertained as per the provision of taxation. The filing of tax returns and the payment of tax in due time is the exclusive responsibility of the management accountant.

Internal Audit: Internal audit as a discipline of management accounting makes arrangements for performance appraisal of the organization's various departments. Thus, a management accountant must possess knowledge about the fixation of responsibilities and measurement of results.

Office Services: To discharge the responsibilities efficiently, a management accountant has to deal with data processing, filing, copying and duplicating. His area of responsibilities also included the evaluation and reporting about the utility of different office procedures and machines.

1.2.1 Functions

The basic role of management accounting is to provide accurate and relevant information to the internal parties of an organization for decision making. To discharge this responsibility effectively, management accounting has to undertake collection, processing, analysing and interpreting of data, as well as communication of the resulting information to such internal parties who intend to use the same in their decision-making process. In fact, the said activities can be recognized as the

NOTES

bases to identify and examine the functions of management accounting and accordingly the major functions are summarized below:

- **Data Collection:** The first function of management accounting is to collect the requisite data from all possible resources. Since the data was traditionally restricted only to economic and financial items/factors, management accountants would make use of the financial statements like profit & loss account and balance sheet for the purpose. Over the past few years, the activities of management accounting have crossed all traditional boundaries by considering not only monetary items and factors in its studies, but also non-monetary factors like. Such paradigm shift in the approach of the management accounting has made its scope much wider. To meet the growing demands of the wider scope, management accounting is bound to utilize both internal as well as external sources of data collection.
- **Data Processing:** The data so collected and stored needs to be converted into information through processing. Data processing refers to the series of activities consisting of compilation, classification, tabulation and summarization that aims to make data information.
- **Analysis and Interpretation:** The data collected from various internal as well as external sources does not have inherent meaning and in fact, its meaning is generally influenced by the nature and scope of the tools and techniques used for its analysis. Further, the data as such is not of much use for the management but it becomes so once it is analysed and interpreted in the context of the nature of the decisions. Thus, the process of analysis and interpretation makes the data so significant for the success of the organization that it is being recognized as a strategic asset for the company in a competitive market. However, the management accountant has to choose the relevant and most appropriate technique for proper interpretation of the data after taking into consideration the nature of the concerned problem.
- **Communication:** as a crucial function of management calls for the transmission of information to the concerned parties for use. Management accounting plays a special role in managing the affairs of the business by providing not only the conventional reports to the decision makers of an organizations but also in taking necessary measures to ensure the supply of adequate information at right time to enable the decision-makers of the organization to address the challenges of the changing environment.

In addition to basic functions discussed above, management accounting is also responsible to carry out some secondary functions that are summarized below:

- **Coordinating:** Management accounting is often entrusted with the responsibility to coordinate the various activities of a business. Organizations generally use techniques such as budgeting and financial reporting for the purpose.

- **Special Studies:** Contemporary business is operating in a dynamic environment where even a minor change in any of its elements can have a significant impact on the business outcomes. Therefore, management is always interested to know the areas of business which can contribute to the stability and profitability of the concern. To meet this objective, management accounting carries out various special studies such as sales analysis, economic forecasts, price spread analysis, etc.
- **Tax Administration:** In the modern business organizations, tax administration is being recognized as a significant area of study that falls within the scope of management accounting. Tax administration involves tasks like the submission of necessary documents and return to the tax authorities, including the supervision of all matters relating to tax.

1.2.2 Importance

The primary objective of a management accounting system is to provide accurate and relevant information to internal users with the aim of helping the management to attain efficiency and effectiveness in the organization. To achieve this goal, management accounting helps an organization in the process of management which generally consists of activities like planning, organizing, evaluating, and communicating.

Planning: Planning is an activity of management that requires the application of not only a scientific approach but also a systemic approach to decision making. All organizations irrespective of their nature of business, need to plan both at strategic and operational levels to remain competitive in the market. Since the most crucial dimension of planning that the management of an organization must focus upon is strategic in nature, one of the basic functions of the management accountant is to help management not only in the selection of the company's goals and formulation of policies and strategies but also in the allocation of resources to achieve these goals. Different accounting techniques are used by the management to discharge the function of planning efficiently. Important among them are cost-volume-profit analysis, direct costing, capital budgeting and cash budgeting.

Organizing: Organizing, which basically involves grouping of activities, defining the responsibility and granting authority to employees, aims to develop structural relationship among people and physical resources to carry out plans and accomplish the organization's stated objectives. Since organizing is prerequisite for the success of any organization, therefore, this function not only calls for undivided attention from the management of an organization but also continuous monitoring and audit to ensure its effectiveness and relevance in a dynamic business environment. To attain this objective, management accounting assists the management of an organization in organizing by establishing cost and/or cost centres.

NOTES

Evaluating: Evaluating, commonly known as controlling, is the process of determining whether the organizational performance is consistent with the plans. This function of management, in fact, involves the comparison of actual performance with the standards to identify the deviation if any for the purpose of initiating and implementing measures to adjust organizational activities toward goal attainment. Management accounting helps the management of an organization to monitor progress and make appropriate adjustment by generating various feedback/ performance reports. An effective evaluation system contributes to the efficiency of organization which in turn increases the profitability of the concern.

Communication: Communication, which involves transmission of information to the stakeholders, has been recognized as an essential function of management accounting. In fact, the management accountant spends the maximum time in communicating with various parties that are interested in the affairs of the business. In addition to the publication of company's annual report, which is considered the basic task of a management accountant, it becomes equally important for him to prepare various supplementary reports required by the management to address various problems and challenges that emerge due to changing and competitive business environment.

Check Your Progress

1. Who exclusively uses the information provided by management accounting?
2. What is the use of budgeting as a management tool?

1.3 DIFFERENCES BETWEEN FINANCIAL ACCOUNTING - COST ACCOUNTING AND MANAGEMENT ACCOUNTING

The compartmentalization of accounting into various branches generally sounds somewhat artificial and misleading as all these branches are usually drawn from a common pool of financial data used in preparing reports for groups who are often involved in making a variety of interdependent decisions. But a close examination of the two systems shows that they differ in several ways from each other. Some major differences between these two accounting systems are summarized in Table 1.1

NOTES

Table 1.1 *Comparison of Financial Accounting and Management Accounting*

Areas of Comparison	*Financial Accounting*	*Management Accounting*
Objective	• To measure and assess the business result and financial position of a concern	• To help decision-makers by providing them relevant and sufficient data
Nature	• Historical in its outlook	• Prospective in nature
Adherence	• Governed by generally accepted accounting principles (GAAP)	• Does not focus on generally accepted accounting principles (GAAP)
Subject matter	• Financial accounting statements are confined to the business as a whole	• Management accounting reports are prepared for each unit or division of the business separately in order to ensure effective planning and control
Compulsion	• Obligatory for the organization to maintain a system of financial accounting	• Discretion of the organization to have system of management accounting
Precision	• Focus on precision	• Based on approximation
Frequency of reports	• Financial accounting statements are prepared at the end of the financial period which is usually a period of 12 months	• The management accounting reports and statements are prepared at regular intervals depending upon the demand of the decision-maker
Recipients	• The statements are extensively used by outsiders	• The statements are exclusively meant for internal parties
Nature of the data used	• Recognize only such business transaction that can be expressed in monetary units	• Recognizes both monetary as well as non-monetary data
Publication	• Financial statement are generally published every year	• Management accounting statements and reports are not generally published

Objectives: The basic objective of accounting is to measure the business result and assess the financial position of an organization. To achieve this objective, financial accounting has to perform functions like recording, classifying and summarizing business transactions of an organization during the accounting period. Such functions are related to the preparation of final accounts, *i.e.*, profit and loss account and balance sheet. Contrary to this, the objective of management accounting is to facilitate managerial decisions. Management accounting deals with the preparation of analytical and critical financial reports to assist management in improving the organization's performance.

Nature: Financial accounting is historical in its outlook in the sense that it has to maintain records of such business events that have taken place during the accounting period. Under financial accounting system a transaction is recorded as and when it takes place. Therefore, prospective transactions are not considered before their maturity under such system of accounting. On the other hand, management accounting system is devised to help managers in shaping future operations of the business. It deals with projection of data to be used for planning and decision making for the future. Thus, management accounting has prospective character.

Adherence to Accounting Principles: Financial accounting system is based on some accounting principles and conventions which a financial accountant has to strictly follow while preparing financial accounts and statements. The financial accounting system can be result-oriented only when the accounting principles and

NOTES

conventions have been properly followed and applied. But management accounting is not bound by the constraints of generally accepted accounting principles and conventions. The preparation of reports and statements under management accounting are governed by the requirements of the management. Management can frame its own ground rules and principles regarding the form and content of information required for internal use.

Subject Matter: Financial accounting considers the business as one entity and accordingly financial accounting reports have been confined to the business operations as a whole. Such statements present the position and the performance of the entire business. Whereas under management accounting system each unit/ department/division/cost centre of the business is treated as a separate entity in order to ensure effective planning and control. Therefore, profitability and performance reports are prepared for each unit or division of the business separately.

Compulsion: The Indian Companies Act has made it obligatory for the companies to maintain a system of financial accounting. At the same time, the benefits as offered by a financial accounting system have made it more or less compulsory for the non-company organization. On the other hand, the setting up of management accounting system is at the discretion of the management.

Precision: Financial accounting pays more emphasis on precision and considers only actual figures in the preparation of its statements. There is no scope for approximate figures in financial accounting. But the reports and statements as prepared under management accounting system contain more approximate figures than the actual figures. Thus, management accounting is less precise as compared to financial accounting.

Frequency of Reports: The financial statements, the outcome of financial accounting, are prepared at the end of the financial period which is usually a period of 12 months. But the management accounting reports and statements are prepared at regular intervals so that management may not face any difficulty in decision making. Management is constantly informed about the business performance through these reports and statements. Thus, the reporting frequency of management accounting is much higher as compared to reporting of financial accounting.

Recipients: Financial statements such as profit and loss and balance sheet, are extensively used by outsiders *i.e.*, shareholders, creditors, tax authorities, etc. On the other hand, management accounting reports are exclusively meant for management. Such reports are not easily available to outsiders.

Nature of Data Used: The financial statements as prepared under financial accounting contain only such transactions that are expressed in monetary terms. The non-monetary events such as nature of competition, business reputation, change in fashion, are not at all considered by financial accounting. But management accounting uses both monetary and non-monetary data.

Publication: Financial accounting statements are published by almost every business organization for the information of the general public. The Indian Companies Act has made it compulsory for every company to publish its final accounts *i.e.*, profit and loss account and balance sheet. By contrast, the publication of management accounting reports and statements is not mandatory.

Distinction Between Cost Accounting and Management Accounting

An examination of the meaning and definitions of cost accounting and management accounting indicates that the distinction between the two is quite vague. Some writers even consider these two areas as synonymous while others distinguish between the two. Horngren, a renowned author on the subject, has gone to the extent of saying, '*Modern cost accounting is often called management accounting. Why? Because cost accountants look at their organization through manager's eyes*.' Thus managerial aspects of cost accounting are inseparable from management accounting. One point on which all agree is that these two types of accounting do not have clear cut territorial boundaries. However, distinction between cost accounting and management accounting may be made on the following points mentioned in Table 1.2.

Table 1.2 *Cost Accounting vs Management Accounting*

Basis	Cost Accounting	Management Accounting
1. **Scope**	Scope of cost accounting is limited to providing cost information for managerial uses.	Scope of management accounting is broader than that of cost accounting as it provides all types of information, *i.e.,* cost accounting as well as financial accounting information for managerial uses.
2. **Emphasis**	Main emphasis is on cost ascertainment and cost control to ensure maximum profit.	Main emphasis is on planning, controlling and decision making to maximize profit.
3. **Techniques employed**	Various techniques used by cost accounting include standard costing and variance analysis, marginal costing and cost volume profit analysis, budgetary control, uniform costing and inter-firm comparison, etc.	Management accounting also uses all these techniques used in cost accounting but in addition it also uses techniques like ratio analysis, funds flow statement, statistical analysis, operations research and certain techniques from various branches of knowledge like mathematics, economics, etc., whatsoever can help management in its tasks.
4. **Evolution**	Evolution of cost accounting is mainly due to the limitations of financial accounting	Evolution of management accounting is due to the limitations of cost accounting. In fact, management accounting is an extension of the managerial aspects of cost accounting.
5. Statutory Requirements	Maintenance of cost records has been made compulsory in selected industries as notified by the Govt. from time to time.	Management accounting is purely voluntary and its use depends upon its utility to management.
6. **Database**	It is based on data derived from financial accounts.	It is based on data derived from cost accounting, financial accounting and other sources.
7. **Status in organization**	In the organizational set-up, cost accountant is placed at a lower level in hierarchy than the management accountant.	Management accountant is generally placed at a higher level of hierarchy than the cost accountant.
8. **Installation**	Cost accounting system can be installed without management accounting.	Management accounting cannot be installed without a proper system of cost accounting.

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Check Your Progress

3. What is the difference in the nature of data used in financial and management accounting?
4. Which out of the two accounting areas is purely voluntary: cost or management accounting?

1.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Information provided by management accounting is seclusively for use by management for internal use. Such information is not to be given to parties external to the business.
2. As a management tool, budgeting aims to coordinate and integrate the efforts and activities of various departments with the cooperation of those who seek to achieve a common goal.
3. Financial accounting recognizes only such business transaction that can be expressed in monetary units, whereas management accounting recognizes both monetary as well as non-monetary data.
4. Management accounting is purely voluntary and its use depends upon its utility to the management.

1.5 SUMMARY

- Management accounting is a segment of accounting that deals specifically with the accounting and reporting of information to management regarding the detailed operations of the company in order for decisions to be taken in various areas of business.
- Management accounting has to perform two separate, distinct functions of financial and management reporting and the data needs for each are often different.
- The main characteristics of management accounting are that it is useful in decision making, basic accounting information is drawn from financial and costing accounting, it is for internal use, it is purely option, is concerned with future and there is flexibility in presentation of information.
- The contemporary subject matter of management accounting highlights its importance in that includes areas such as financial accounting, cost accounting, financial statement, budgeting, inflation accounting, management reporting, tax accounting, etc.

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- The functions of management accounting include data collection, data processing, analysis and interpretation, communication, coordinating, special studies, tax administration, etc.
- Management accounting helps an organization in the process of management which generally consists of activities like planning, organizing, evaluating, and communicating.
- The compartmentalization of accounting into various branches generally sounds somewhat artificial and misleading as all these branches are usually drawn from a common pool of financial data used in preparing reports for groups who are often involved in making a variety of interdependent decisions. But a close examination of the two systems shows that they differ in several ways from each other.

1.6 KEY WORDS

- **Management accounting:** It is segment of accounting that deals specifically with the analysis and reporting of information to management about the operations of the organization with an objective to facilitate decision making.
- **Financial accounting:** It is a discipline of accounting which helps to regulate a system that is capable of recording, classifying and summarizing the mercantile transactions occurring in an organization.
- **Cost accountancy:** It is an extension of the general accounting system. It is responsible for gathering, classifying and analysing the cost data required by the management to attain various organizational objectives.

1.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. Briefly discuss the meaning of management accounting.
2. Write a short note on the features of management accounting.
3. What is the importance of management accounting?
4. What are the points of distinction between cost and management accounting?

Long Answer Questions

1. Discuss the scope of management accounting.
2. Describe the major features of management accounting.
3. Differentiate between financial and management accounting.

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1.8 FURTHER READINGS

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UNIT 2 BUDGETARY CONTROL

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Structure

2.0 INTRODUCTION

Budgetary control is an important tool of planning and control. *Planning* involves looking systematically at the future so that decisions can be made today which will bring the company its desired results. *Control* is the process of measuring and correcting actual performance to ensure that plans for implementing the chosen course of action are carried out. In this unit, you will learn about the concept of budgeting and budgetary control.

2.1 OBJECTIVES

After going through this unit, you will be able to:

- Assess the meaning of budgetary control
- Discuss the concept of budgeting
- Analyse the different types of budgets

2.2 MEANING AND CHARACTERISTICS, OBJECTIVES, STEPS, ADVANTAGES AND LIMITATIONS

Commercial organizations always aim to attain the highest volume of sales at the minimum cost in order to maximize their profits. To attain this objective, organizations need to realize that planning and control of activities become essential absolutely. It is, in fact, the system of budgetary control that provides the organizations with the framework which helps them to achieve this objective.

Budgetary control is a systematic process designed to plan and control the major activities of a firm's business through budgets prepared in advance with an

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objective to ensure effective use of resources. In the words of Batty (1978), *Budgetary control is a system which uses budgets as a means of planning and controlling all aspects of producing and/or selling commodities or services*. According to Scott (1970), *it is the system of management control and accounting in which all operations are precasted and so far as possible planned ahead and the actual results compared with the forecasted and planned ones*.

CIMA (1991) defines budgetary control as, the establishment of budgets relating to the responsibilities of executives to the requirements of a policy and the continuous comparison of actual with budgeted results, either to secure by individual action the objective of that policy or to provide a basis for its revision.

In the opinion of Brown and Howard (1975), *Budgetary control is a system of controlling costs which includes the preparation of budgets, coordinating the departments and establishing responsibilities, comparing actual performance with the budgeted and acting upon results to achieve maximum profitability*.

As per MA Sahaf, *budgetary control is a process of managing an organization in accordance with an approved budget in order to keep total expenditure within authorized limits. It is designed to assist the management in deciding the future course of action and to develop the basis for evaluating the efficiency of operations*. Thus, a budgetary control consists of:

- Preparation of budgets for major activities of the business;
- Measurement and comparison of actual results with budgeted targets;
- Computation of deviation, if any; and
- Revision of budget, if required.

Thus, budgetary control requires preparation and designing of the budgets revealing clearly the financial responsibilities of executives in relation to the requirements of the overall policy of the company followed by a continuous comparison of actual business results with budgeted results to secure the objectives of the policy. If the principles of budgeting are carried out in a proper manner, the company can be assured that it will efficiently use all of its resources and achieve the most favourable results possible in the long run.

Objectives of Budgetary Control

The main objectives of budgetary control are as under:

- To provide useful, accurate and reliable information to enable managers formulate future business policies.
- To help the organizations in exercising control over costs by preparing separate budgets for each department To evaluate the results of various policies and facilitate supervision over the various factors of production.

NOTES

- To eliminate the danger of over capitalization and under capitalization by determining the total capital requirements of a business firm with the help of production budget and working capital estimates.
- To locate deficiencies in production system by preparing separate production capable of ascertaining the efficiency of production.
- To promote research and development activities of an organization as budgetary control policies and programmes are usually based on past experience.

Advantages of Budgetary Control

Budgetary control is perhaps the most useful tool used by the management for planning and controlling major activities of the business. However, the system of budgetary control in itself does not ensure good planning or control but it helps executives to plan ahead and exercise control over people and operating events. In fact, such a system not only provides information on probable future business results but also the resources like money, men, materials and facilities required to achieve such results. The most notable benefits derived from the system of budgetary control are as follows:

- Through its disciplined approach, it coordinates the planning of all functional executives towards the common profit making goal.
- Motivates executives to think ahead by impressing upon them to formalize their planning efforts.
- Provides managers an opportunity for self-evaluation by offering them goals and objectives against which they can evaluate their performance without any difficulty. Such an arrangement makes each member of the organization clear about his role and contribution in attaining organizational goals.
- Enables an organization to predetermine the benefits and costs of the projects under various alternative operating conditions. Such a comparative analysis helps it to evaluate the most appropriate allocation of resources.
- Provides a framework that specifies measurable periodic objectives for each phase of planning.
- Helps managers to identify expected operation problems from business activities but also provides them the basis for solving these problems or avoiding them before they occur.
- Make employees of the organization conscious of the needs to conserve business resources.
- Maximize benefits of decentralization.
- Makes it obligatory for the enterprise to maintain adequate financial records that can be associated with the budget.

NOTES

- Serves as an excellent vehicle and effective communication system for the exchange of ideas and coordination of plans among various levels of management.
- Reveals budgets prepared for efficient and effective use of resources.
- Increases participation of employees in the preparation and execution of budgets thereby boosting the morale among them which in turn contributes to the output.
- Helps a company meet market competition efficiently by keeping the cost at the minimum level.

Limitations of Budgetary Control

Despite the benefits mentioned earlier, budgetary control suffers from serious limitations. Management must keep such limitations in mind while using the tool of budgetary control. The major limitations of budgetary control system are summarized below:

- Since budget estimates are based on approximations and personal judgements, therefore, they are always doubtful. In fact, the quality of budgets is always associated with the intelligence, skills and experience of the budget persons.
- The premises of the budgetary control system change rapidly with the change in business conditions. As a result, business executives face a lot of difficulties in the execution of budgets.
- The success of budgetary control largely depends on its execution which in turn depends on the cooperation and participation of all levels of management. Every member of the organization must direct his efforts to achieve the objectives of the budget. Any lapse in their coordination or cooperation may result in poor performance.
- The installation of budgetary control system is a costly affair, and therefore, small organizations may not afford it. Even financially sound enterprises must adopt this system only after analysing properly its cost and benefits.
- Budget targets sometimes are considered as pressure tactics which lower the morale of the employees.
- The formulation of the budgets is a time-consuming process as a good amount of time is wasted in their preparation, evaluation and revision.
- There is an old saying to the effect that 'a man is usually down or what he isn't upon'. Often executives do not realize the utility of the budgetary control system.
- Under budgetary control system every budget centre tries to achieve its objectives without taking into consideration the objectives of other budget centres and overall objectives of the budgetary control system. This creates

conflict among various units of the organization which ultimately interrupts the efficiency of the system.

Essential Characteristics of a Good Budgetary Control

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A good budgetary control must possess the following characteristics:

- There must be a common authority to enjoy the rights and privileges as well as to fulfil the obligation. Actual users must be consulted before actually allocating different resources.
- The supervisory staff must be held responsible for all the functions of the business and proper utilization of all the resources of the business.
- Independence of action must be ensured for the administration in those matters for which they are accountable. In such matters, they must be consulted and their views should be given due weightage.
- One who gives orders must also provide facilities for the execution of those orders.
- There must be test checking of the work at regular intervals and the results must be compared with the targets. Shortcomings must be ascertained and measures should be suggested to overcome them.
- There must be some system for rewarding better results and penalizing poor results. Incentives for better work must be provided. Inefficiency must not be condoned.

Requirements and Steps Involved in Budgetary Control

The prerequisites for good budgetary control are essentially the same as for sound business management. For effective budgetary control, the firms need to:

- develop the statement of objectives and policies to guide management in reaching its business goals;
- build up a sound plan for the organization with clearly defined responsibilities and authorities for each management and supervisory position;
- establish a clear understanding of cost behaviour and product cost structure;
- develop a plan of operations over a given period of time to achieve objectives efficiently and effectively;
- provide for measurement of performance through timely comparative control reports;
- take necessary action in the execution of plans to set right unsatisfactory performance;
- revise the budgets when required.

The concept of budgetary control formalizes the process implied in these requirements by incorporating the above steps into a comprehensive financial plan

NOTES

or budget. It should be obvious that the financial plan or budget is not just a forecast or a summary of the business results a year ahead. It is instead a plan of operation. The plan must be based on good operating practices and soundly conceived management strategy. It should have a certain extent of flexibility, a 'stretch' in it. This means that operating men should incorporate in the budget performance, goals that are attainable by hard work and dedicated effort. An easy test of whether or not a business budget has been built on good planning and control concept is to check these points:

- Sales and production requirements should be defined in terms of quantities by products.
- The variable and total costs of producing each product should be identified on a predetermined basis in the budget.
- Budgeted costs and expenses should be stated for each responsibility centre.
- The degree of capacity utilization of major equipments and facilities should be clearly defined in the budget plan.
- All departmental budgets should be based on the same volumes of product and service requirements and should meet an acceptable profit goal.

If an organization's budgetary control system does not meet these tests, functional executive need to discuss the lapses with the budget personnel to seek improvements in the system.

Check Your Progress

1. What is the required of the budgetary control for securing the objectives of a company's policy?
2. How does budgetary control help organizations eliminate the danger of over capitalization and undercapitalization?

2.3 TYPES OF BUDGETS

Budget is generally recognized as a plan of action to be pursued by an organization during a defined period of time in order to achieve its objectives. It is a statement of anticipated results expressed either in financial or non-financial terms. According to Williamson (2003) *A budget is a formal plan of action expressed in monetary and other quantitative terms*. Gordon and Shillinglow (1974) state, *Budget is a pre-determined detailed plan of action developed and distributed as a guide to current operations and as a partial basis for the subsequent evaluation of performance*.

CIMA (1991) defines *A budget is a financial or quantitative statement prepared prior to a definite period of time of the policy to be pursued during that for the purpose of attaining a given objective*.

Sizer (1979) explains *Budgets are financial and/or quantitative statements prepared and approved prior to a defined period of time of the policy to be pursued during that period for the purpose of attaining given objective.*

Author MA Sahaf is of the view that *a budget is a detailed schedule of the proposed combinations of the various factors of production which the management deems to be the most profitable for the defined period. It may be a forecast of sales, production costs, distribution costs, and administrative and financial expenses–and, therefore, of profit or loss*. It serves as a road map for executives and makes them aware when the company is straying from its planned route.

Considerations in Preparing Budget

The following important points must be borne in mind while preparing budget:

- Budgets are prepared to achieve the objectives of the business. No useful budget can be prepared without a complete knowledge of the objectives, nature and policies of the business.
- The duration of the budget must be determined according to the special circumstances of each business. Ordinarily, every company needs both short-term as well as long-term budgets. Short-term are usually in the form of income, expenditure, cash and sales. Similarly, the examples of long-term budgets are capital expenditure, training of business personnel, and expansion of the business.
- The persons who prepare the budgets must be honest and sincere. They should possess full knowledge of the nature, targets and the resources of the company. They must have foresight and competence to prepare well-balanced budgets.
- Adequate, accurate and reliable statistical information must be available for the preparation of a good budget. Past experience helps in projecting future.
- Budget must be reasonably elastic and flexible. It must be capable of being adjusted and changed according to new changes.
- An overenthusiastic business may fix-up extraordinarily high targets. They may prove to be unrealistic or incapable of being achieved. Efforts made in preparing the budgets may go waste. To avoid these dangers, budgets must be prepared by men of experience and foresight. On the one hand, they will try to fix up the targets according to their resources and on the other hand, they will keep the targets of the previous budgets quite separate from the new targets.

Classification of Budgets

Different authorities have given different classifications of budgets. Some classify them on the basis of functions involved, period covered, nature of transactions

while others classify them according to activity levels. Accordingly, the following classifications are given:

NOTES

Budgets according to activity levels:

- Fixed budget
- Flexible budget

Classification on the basis of nature of transactions:

- Operating budget
- Capital budget

Period classification:

- Long-term budget
- Short-term budget

Functional classification:

- Master budget
- Subsidiary budget

However, classification on the basis of functions is more popular and common almost in every business concern.

Fixed Budget

Although this approach to budgeting is not popular among the firms yet a few firms do use fixed budget in certain areas of expenses management. Generally fixed budget is referred to as predetermined costs projected at a particular capacity level. That is, once capacity is projected at a particular level, the individual department gathers and classifies their costs at that level. The budget thus prepared is known as a fixed budget. Such budgets assume that the amount of rupees shown in the budget is triggered by the passage of time irrespective of production levels or the volume of activity. The CIMA (1991) defined fixed budget as a budget which is designed to remain unchanged irrespective of the level of activity actually attained. In the words of Wilson (1975) *a fixed budget is one that is compiled for a given set of assumed operating conditions and for a clearly specified but estimated level of activity, and which management proposes to leave unchanged during the period to which it relates—regardless of changes in the actual level of activity experienced or in the conditions facing the company during that period*. Thus, fixed budget is a plan that expresses only one level of estimated activity or volume. Such a budget is also known as static budget. The term 'fixed budget' is probably a misnomer because this budget really is never fixed. Business and economic conditions constantly change and the management has to review and change the budgets in the light of those changes.

Flexible Budget

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Firms that recognize the tendency of fixed overhead to vary with substantial changes in production prefer to use a flexible budget. This is simply a series of fixed budgets that apply to varying levels of production. According to CIMA (1991), a flexible budget is *a budget which, by recognizing the difference between fixed, semi-fixed and variable costs, is designed to change in relation to the level of activity attained.* Thus, a flexible budget is a series of cost budgets, each prepared for a different level of capacity. The capacity levels are set at percentages of capacity or at the production of a specified number of units at set levels of capacity. In fact, costs are broken down into fixed, variable, and semi-variable under various levels of capacity. Although flexible budgets generally do not distinguish between variable and fixed overhead yet they provide a single rate for both types of overheads. This rate is established by dividing estimated overhead at the normal production level by the normal volume of production.

Flexible budgeting can be incorporated in one of two ways—*step budget*, wherein budgets are developed for different levels of operation, or *variable budget*, where budgets are prepared on a variable cost basis providing progressively greater budget allowances as the volume of activity increases. Business executives prefer the technique of flexible budgeting as it can be easily understood by the supervisors at all levels and with all degrees of education because of the realistic way in which such budgets accommodate actual operating conditions in the plant. The major significance of flexible budgeting is that it provides completely realistic budget amounts. There are very less chances for variances, which too can be the result of inefficient control or changes in operating conditions.

Illustration 2.1 The cost details obtained from financial records of Safa Ltd., for production of 500 units are given below:

Particulars	*Per Unit (₹)*
Material	40
Labour	30
Variable overhead	12
Selling and distribution expenses (20 per cent fixed)	10
Administrative expenses (40 per cent variable)	15
Fixed overheads (₹ 7,500)	15
Selling cost per unit	122

You are required to prepare a budget for production of:

(i) 700 units; and

(ii) 900 units.

NOTES

Solution

Safa Ltd.
Flexible Budget

	OUTPUT					
	500 Units		***700 Units***		***900 Units***	
	Per Unit	***Amount (₹)***	***Per Unit***	***Amount (₹)***	***Per Unit***	***Amount (₹)***
Material	40	20,000	10	28,000	40	36,000
Labour	30	15,000	30	21,000	30	27,000
Variable overhead	12	6,000	12	8,400	12	10,800
Selling & distribution						
Expenses:						
Fixed (20 per cent)	2	1,000	1.43	1,000	1.11	1,000
Variable (80 per cent)	8	4,000	8	5,600	8	7,200
Administrative Expenses:						
Fixed (60 per cent)	9	4,500	6.43	4,500	5	4,500
Variable (40 per cent)	6	3,000	6	4,200	6	5,400
Fixed overhead	15	7,500	10.71	7,500	8.33	7,500
Total Cost of Sales	122	61,000	114.5	80,000	110.44	99,400

Operating Budget

The operating budget is a plan of the expected revenues and expenses from normal operations and activities to be carried out by the organization in the future. Such a budget contains a detailed programme of activities that a firm desires to perform during the budget period which normally consists of one year. The profit and loss items like sales, production, distribution expenses and administrative overheads are also projected in this budget. In fact, the budget often states such performance measures which are not apparently seen in the financial statements. The best examples of operating budgets are raw material budget, inventory budget, labour force budget, and so on The nature and scope of various types of operating budgets are discussed in a later section of this unit.

Capital Budget

Capital budget is a plan reflecting the investments of the business in fixed assets and often includes amounts for large expenditure that have a long-term impact on the firm's financial position and growth. The activities that fall within the scope of capital budget mainly consists of programmes on infrastructure development, output expansion, and increase in productive resources. Since the outlay of capital budget is normally higher as compared to operating budget, they require careful planning, analysis and evaluation. Such budgets, in fact, aim to contribute maximum to the organizational goals and objectives.

Short-term Budget

Short-term budgets refer to such budgets which cover activities of the business for a period of a year or shorter. Generally, firms prefer to prepare such budgets for sales and cash overheads. However, such budgets can be broken down to shorter periods of six months, three months and possibly even one month. Experts generally believe that managers enjoy more flexibility by breaking down the period of budget in shorter periods. Normally, departmental executives are responsible for the preparation of short-term budgets. Various departments of the enterprise need to work in coordination for the preparation of short-term budgets as the top-level management coordinates the final budget on the basis of short-term budgets.

Long-term Budget

To meet the demands of growing business and competition, firms need to move beyond the short-range plan to look ahead for more than one year. Long-term budgets may cover periods of one, three, five and even more years depending upon the nature of the business. According to the National Association of Accountants, America, a long-term budget is *a systematic and formalized process for purposeful directing and controlling future operations towards a desired objective for periods extending beyond one year*. The responsibility for the preparation of long-term budgets generally rests with top-level management. The top-level management is generally responsible for strategic decisions concerned with growth and prosperity of business. Since the preparation of such a budget demands the study of both internal factors as well as external factors like industry competition, economic growth, social and cultural change, and technological development, it calls for strategic capabilities on the part of management.

Master Budget

The master budget sets out a firm's plan for the operations and resources expressed in financial terms for a given period. It is a summary of the budget schedules in capsule form made for the purpose of presenting in one report the highlights of the budget period. The CIMA (1991), defines it as, *The summary budget, incorporating its component functional budgets which is finally approved, adopted and employed*.

Davidson and others state, *The master budget, sometimes called the comprehensive budget is a complete blueprint of the planned operations of the firm for a period*.

Thus, the master budget is an overall budget of a firm which includes all other small departmental budgets. It is network consisting of many separate budgets that are interdependent. In fact, the master budget contains consolidated summary of all the budgets prepared by the organization. Such a budget coordinates various activities of the business, directing them towards a common goal. Few top

executives of the business are supplied with copies of master budgets. Such a budget is of no use to departmental executives. It draws the attention of the management to those issues which must require immediate attention or which must be avoided without any delays in the interest of the business.

NOTES

Preparation of a Master Budget: It is a complex process that requires much time and effort by the management at all levels. It includes the preparation of a projected profit and loss account (income statement) and projected balance sheet. The preparation of master budget involves the preparation of:

- sales budget;
- production cost budget;
- cost budget;
- cash budget;
- projected profit and loss account on the basis of information collected from the above stated four steps; and
- projected balance sheet from the information available in last year's balance sheet and with the help of the steps stated above.

The format of the master budget is given in Tables 2.1 and 2.2.

Table 2.1

.... Co. Ltd.,

Master Budget

(*For the year ending as on . . . .*)

Particulars	*Previous Period Amount (₹)*	*Budgeted Period Amount (₹)*	*Particulars*	*Previous Period Amount (₹)*	*Budgeted Period Amount (₹)*
To cost of product (as per production cost budget)			By sales (as per sales budget)		
Direct material ₹			(a) x product ...		
(......Units@ ₹...) xxx			units @ ₹.....		xxx
Direct wages xxx			(b) x product......		
Prime cost		xxx	units @ ₹		xxx
Factory overheads					
(a) Variable xxx					
(b) Fixed xxx		xxx			
Work cost		xxx			
Administrative, selling and distribution overheads		xxx			
To Net Profit		xxx			
		xxx			xxx

Table 2.2
Budgeted Balance Sheet

Liabilities	*Previous Period Amount* (₹)	*Budgeted Period Amount* (₹)	*Assets*	*Previous Period Amount* (₹)	*Budgeted Period Amount* (₹)
Shareholder's Equity:			*Fixed Assets:*		
Pref. share capital			Plant & Machinery		
Equity share capital			Building		
			Furniture		
Current Liabilities:			*Current Assets*:		
Bill payable			Bill Receivable		
Sundry creditors			Sundry debtors		
Bank loan	________	________	Cash in hand and at bank	________	________
			Inventories	________	________

NOTES

Subsidiary Budget

Subsidiary budgets are those budgets which show income or expenditure appropriate to or the responsibility of a particular activity of the business. They are prepared on the basis of the guidelines framed by the master budget. There may be different kinds of subsidiary budgets depending on the size, nature and policy of the concern but the following are frequently prepared:

- sales budget
- production budget
- production cost budget
- materials budget
- labour budget
- manufacturing overhead budget
- expenses budget
- plant budget
- cash budget.

Sales Budget: It is an estimate of future sales expressed in quantities and/or money. Such a budget, in fact, calls for projection of a firm's sales on a periodic basis. The preparation of an effective sales budget demands the study of both internal and external factors. The internal factors to be considered for the purpose are past activity, present and projected plant capacity, proposed management policies, financial position, sales force size, availability of materials, and promotional campaign. The external factors that must be analysed to enable managers prepare sales budget include extent of competition, government policies and regulations, economic conditions of the country and general trade prospectus. The management should constantly review the above-mentioned factors in order to find out the quantum of change in them and its impact on product demand.

Generally, sales budget is recognized as the key budget that leads to the preparation of all other functional budgets. The success of any commercial enterprise largely depends upon the quick turnover of its production. Against this background, every company wants to maximize its sales. However, the maximization of sales has always remained a complex problem that requires proper attention from the management. Every effort must be made to achieve sales targets. The sales budget can be broken down by:

- product lines
- geographic territories
- time span
- types of customers.

A forecast of sales on an industry-wide basis must be broken down so that it applies to a particular firm. Each firm studies its position relative to the total market and calculates its share of the market. In some areas and in certain product lines, one firm may dominate while in other areas and in other product lines, the sales may be shared by the firms in different proportions. The following techniques are used for sales forecasts:

- past trends
- sales executives opinion
- survey methods

The following illustration will further clear the idea about the preparation of sales budget.

Illustration 2.2 MAS Co. Ltd. operates two sales divisions by selling two quality cement products—White and Black in them. For the purpose of submission of sales budget to the budget committee, the following information has been made available.

Budget sales for the current year were as follows:

Product	*Division I*	*Division II*
White	800 at ₹ 100	600 at ₹ 100
Black	400 at ₹ 80	500 at ₹ 80

Actual sales for the current year were as follows:

Product	*Division I*	*Division II*
White	1,000 at ₹ 100	700 at ₹ 100
Black	600 at ₹ 80	450 at ₹ 80

NOTES

The sales division of the company has taken the following decisions at a meeting:

(i) The sales manager observed that product White is popular but underpriced. Therefore, the price of product should be increased by ₹ 20.

(ii) The product Black has less market and the main reason responsible for it is the over price of the product. However, if the price of the product is reduced by ₹ 5, it is expected to generate more demand.

On the basis of these price changes and reports from the sales force, the following estimates have been prepared by divisional sales manager:

Percentage increase in sales over current budget.

Product	*Division I*	*Division II*
White	5	20
Black	10	10

You are required to prepare a sales budget to be presented to the budget committee.

Solution:

Sales Budget
MAS Co. Ltd.

Division	*Product*	*Budget for Future Period*			*Budget for Current Period*			*Actual Sales for Current Period*		
		Qty.	*Price (₹)*	*Value (₹)*	*Qty.*	*Price (₹)*	*Value (₹)*	*Qty.*	*Price (₹)*	*Value (₹)*
I.	White	840	120	1,00,800	800	100	80,000	1,000	100	1,00,000
	Black	440	75	33,000	400	80	32,000	600	80	48,000
	Total	1,280		1,33,800	1,200		1,12,000	1,600		1,48,000
II.	White	720	120	86,400	600	100	60,000	700	100	70,000
	Black	550	75	41,250	500	80	40,000	450	80	36,000
	Total	1,270		1,27,650	1,100		1,00,000	1,150		1,06,000
Total	White	1,560	120	1,87,200	1,400	100	1,40,000	1,700	100	1,70,000
	Black	990	75	74,250	900	80	72,000	1,050	80	84,000
	Total	2,550		2,61,450	2,300		2,12,000	2,750		2,54,000

Production Budget: After the preparation of sales budget, the management turns its attention to the preparation and designing of a production budget. Production budget is a component of the master budget that establishes the level of production planned for budget period. It fixes the target for the future output. In a broader sense, production budget attempts to estimate the number of units of an item of the product line that a company is planning to produce during the budgeted period. Sufficient amount of goods will have to be available to meet sales needs of the budgeted period and the quantity of inventory needed at the end of the period. A portion of these goods will already exist in the form of an opening inventory. The

NOTES

remainder will have to be produced. The quantity to be produced is decided after taking into consideration the following:

- Opening and closing levels of inventories; and
- Quantity required to meet projected sales.

Further, a budget executive has also to analyse the factors mentioned below to enable himself prepare the production budget:

- Maximum production capacity of the business;
- Production planning of the organization;
- Managing policy regarding produce or purchase of components;
- Available storage facilities; and
- Amount of investment required.

The production department must schedule its production in such a way so as to ensure prompt deliveries to the customers. To achieve this objective, the sales department must be closely coordinated with the production department. Neither department can plan and direct its activities in isolation. The department of sales has to depend on production from the production department and at the same time, the production department guides its production levels on the basis of sales estimates as submitted by the sales department.

A format of a detailed production budget is given as under:

.... Co. Ltd.
Production Budget
January, February and March 20xx

Particulars	*January*	*February*	*March*
Sales in quantity (as per sales budget)	xxx	xxx	xxx
Add: Desired inventory at the end	xxx	xxx	xxx
Total quantity required	xxx	xxx	xxx
Less: Stock at beginning	xxx	xxx	xxx
Quantity to be produced	xxx	xxx	xxx

Illustration 2.3 From the following information prepare a production budget for 3 months of NICE Cement Co. Ltd.

(i) The estimated sales for the budget period as reported by sales manager are:

Division	*Types of Products*			
	White (Tonnes)	*Black (Tonnes)*	*Red (Tonnes)*	*Green (Tonnes)*
North	7,000	12,000	16,000	10,000
South	5,000	8,000	10,000	3,000

NOTES

(ii) Estimated stock on June 1, 2012

Types of Product	**Tonnes**
White	1,200
Black	1,500
Red	1,800
Green	1,200

(iii) Desired closing stock on 31st August, 2012

Types of Product	**Tonnes**
White	1,500
Black	1,800
Red	1,400
Green	1,000

Solution

Production Budget for Three Months from June to August, 2012

Estimated Sales During Budget Period	*Types of Products*			
	White (Tonnes)	*Black (Tonnes)*	*Red (Tonnes)*	*Green (Tonnes)*
North	7,000	12,000	16,000	10,000
South	5,000	8,000	10,000	3,000
Total	12,000	20,000	26,000	13,000
Add: Desired stock on 31st August, 2012 (closing stock)	1,500	1,800	1,400	1,000
	13,500	21,800	27,400	14,000
Less: Estimated stock on June 1st, 2012 (opening stock)	1,200	1,500	1,800	1,200
Quantity to be produced	12,300	20,300	25,600	12,800

Production Cost Budget: It is followed by production cost budget that includes the summaries of direct material budget, direct labour budget and manufacturing overhead budget. Each of these budgets must consider the quantities to be produced as reflected in the production budget and the prices of the factors which a firm expects to prevail during the budget period.

Materials Budget: It is prepared with a view to ensure regular supply of the required quantity of raw materials as per the production schedules. A schedule of materials requirement is prepared indicating the unit quantities of each material required per unit of finished product. A firm multiplies the raw material requirements per unit of product by the projected production of each product which gives it the total production requirements.

The quantity of material so calculated must be increased by some pre-determined percentage to allow for waste and spoilage. The quantity of material

NOTES

required for production and the required inventory level will yield the quantities of each material which will have to be available during the budget period. The available quantity of material estimated should be deducted by the inventories of raw material at the beginning of the budget period; the resultant material quantity is the quantity of material to be purchased during the budget period.

The estimation of material requirements is the responsibility of the production engineering department while the estimation of price at which the raw material could be procured from the market is the responsibility of the purchasing department. Materials budget helps the firms not only in keeping wastage of raw material under control but also in the determination of economic order quantity.

The format of detailed materials budget is given as under:

.... Co. Ltd.
Materials Budget
(For the Year Ending ....)

Particulars	***Units***
A. Quantity to be purchased	xxx
Units to be consumed (as per production budget)	
Add: Minimum ending inventory	xxx
Total raw material requirements	xxxx
Less: Stock at the beginning	xx
Purchase requirements	xxx
B. Cost involvement	**(₹)**
---------- units @ ₹ ...	xx
Carriage inwards	xx
Cost of purchases	xxxx

Illustration 2.4 Super Max manufactures two type of products—BEE and TEE. The sales department reports that 35,000 and 48,000 units of BEE and TEE respectively are sufficient to meet the estimated demand during the budget period.

The Engineering department submits the following report in respect of material requirements:

Product Type and Quantity of Material Required Per Unit

	Type	***Qty. (Units)***
BEE	TT	2
	PP	3
TEE	FM	4
	FT	2

Management had adopted the following policy in respect of inventories:

(a) Opening Balance

(i) Finished product

BEE 7,000 units

TEE 4,500 units

(ii) Raw materials

Material TT 20,000 units

Material PP 18,000 units

Material FM 15,000 units

Material FT 13,000 units

(b) Closing balances

(i) Finished product

BEE 10,000 units

TEE 7,000 units

(ii) Raw Materials

Material TT 7,000 units

Material PP 5,000 units

Material FM 3,000 units

Material FT 2,000 units

Draw up a material purchase budget.

Solution:

Materials Budget
(for the Year Ending.......)

	Product BEE		***Product TEE***	
	Material TT (Units)	***Material PP (Units)***	***Material FM (Units)***	***Material FT (Units)***
Material required to produce 38,000 units of BEE product and 50,500 units of TEE product (A)	76,000	1,14,000	2,02,000	1,01,000
Add: Desired closing balance of material at the end of the year	7,000	5,000	3,000	2,000
	83,000	1,19,000	2,05,000	1,03,000
Less: Opening balance of material at the beginning of the year	20,000	18,000	15,000	13,000
Materials required to be purchased during the year	63,000	1,01,000	1,90,000	90,000

NOTES

Working Notes

(A) Calculation of production during the year:

Particulars	*BEE (Units)*	*TEE (Units)*
Estimated sales	35,000	48,000
Add: Desired closing stock of finished products	10,000	7,000
	45,000	55,000
Less: Opening stock of finished products	7,000	4,500
Quantity to be produced	38,000	50,500

Labour Budget: It is developed directly from the production budget. It indicates the quantity and cost of direct labour required to meet production needs. Labour budget discloses the requirement of the skilled as well as unskilled workers for carrying out the budget output. It fixes up the number and class of workers, their wages, incentives, training and other conditions of workers. To ensure effective planning, coordination and control of labour, this budget has to provide sufficient details including the amount of each specific labour operation required to produce each product. This budget helps personnel department in designing appropriate hiring and training of qualified personnel. Thus, labour budget is essential not only for production planning but also for planning personnel resources.

The quantity of labour required to meet production needs can be estimated either from standards or from records of past performance. The simple way to compute the quantity of labour requirement is to divide the required number of units of finished products by the number of direct labour hours required to produce a single unit. For a labour mix, a separate calculation is to be made for each type of labour. The resultant is multiplied by the labour cost per hour as is shown in Illustration 2.5.

Illustration 2.5 The Great Ess Industries Ltd. manufactures three products—X, Y and Z. The enterprise has decided to produce 2,500, 4,000 and 7,000 units of X, Y and Z respectively for the month of March.

The estimated labour hours required to produce each unit are:

Product	*Labour Hours*
X	3
Y	4
Z	2

The cost per labour hour is estimated to ₹ 4

Draw up a labour budget showing (A) quantity and (B) cost of labour.

Solution:

Great Ess Industries Ltd.
Labour Budget
for the Month of March

	Products		
	X	*Y*	*Z*
Estimated production (units)	2,500	4,000	7,000
Labour hour per unit	3	4	2
(A) Total labour hours required	7,500	16,000	14,000
Labour cost per hour	₹ 4	₹ 4	₹ 4
(B) Total labour cost	30,000	64,000	56,000

Manufacturing Overhead Budget: The manufacturing overhead budget is a schedule showing the expected amount of manufacturing cost that will be incurred for the budgeted level of activity. Manufacturing overheads consists of fixed, variable and semi-variable cost components. As discussed earlier, variable overhead costs change proportionately with the volume of production whereas fixed overhead costs remain constant irrespective of output. The semi-variable overhead costs also change with the output but not proportionately. Management has to use some equitable basis to apportion the fixed overheads and the fixed elements of the semi-variable overheads to the various budget centres. Therefore, the preparation of the manufacturing overhead budget requires experience, knowledge, expertise and intelligence on the part of those preparing the budget.

Expenses Budget: Once the production plans have been designed, the overheads need to be determined to produce the products. Departmental managers ordinarily prepare their own budgets for indirect labour and overhead factors. Expenses budget consists of several sections, namely, factory overheads, administration expenses, and sales and distribution expenses. These budgets are prepared on the basis of figures of income statements of the previous years. A proper distinction of recurring and non-recurring is made while preparing these budgets.

The expenses budget format is given as under:

...... Co. Ltd.
Expenses budget (For the Year Ending ....)

	(₹)	(₹)
Factory overheads:		
Fuel and power	xxx	
Water	xxx	
Depreciation	xxx	
Supervisor's salary	xxx	xxxx
Administration expenses:		
Salaries	xxx	
Printing and stationery	xxx	
Rent and rates	xxx	

NOTES

Lighting	xxx	
General expenses	xxx	xxxx
Sales and distribution expenses:		
Salesmen's salaries	xxx	
Salesmen's commission	xxx	
Advertising	xxx	
Entertainment and car expenses	xxx	
Shop display	xxx	
Display	xxx	xxxx
Total expenses		xxxx

Plant Budget: In large-scale industries where production is carried on with the help of costly machines, plant budget is prepared to ensure maximum utilization of available machines.

Cash Budget: The availability of cash in adequate quantity at proper time at a reasonable cost is essential for smooth operation of a business. The cash budget attempts to estimate cash requirements of a business well ahead of time. According to Soloman, (1968) 'the cash budget is an analysis of flow of cash in a business over a future, short or long period of time. It is a forecast of expected cash intake and outlay'. The cash budget converts all planned actions into cash inflows and cash outflows. Thus, it shows the anticipated flow of cash and the timing of receipts and disbursements based upon projected revenues and expenses. This budget is significant because it helps management in planning to avoid unnecessary idle cash balances on the one hand and avoidable expensive borrowings on the other. It indicates not only the total amount of financing required but its timing as well. The cash budget generally consists of the following two major sections, viz., receipt section and payment section.

Normally, the major source of cash receipts for any business is sales. For credit sales, accounts receivable are eventually converted into cash as debtors pay their accounts. However, in this connection, management has to estimate properly the time taken to collect outstanding accounts. At the same time, provisions must be made for discounts, returns, allowance granted and uncollectible accounts. From a study of past records and recent experience in the rate of collection, it should be possible to predict approximate receipts on accounts.

Special items such as increase in cash from sale of equipment, issuance of shares, borrowing, and so on must be considered in the estimation of cash receipts. Thus, cash receipts are expected to be generated from the following sources:

- cash sales;
- collection from debtors,
- non-operating incomes like dividend, commission, interests, and so on,
- sale proceedings from capital assets;
- share capital and debentures; and
- loans and overdrafts.

NOTES

The payment section of the cash budget consists of all cash payments that are planned for the budget period. These payments will include payments for merchandise and overhead acquired or incurred for the current budget period as well as for payables on the past budget period. Payments on various accounts are not made simultaneously with the cost incurred or materials and services used. The expenditure on various items like insurance, rent and advertising are often paid in advance while payments for materials, labour and other costs of operation frequently follow acquisition and use. Capital expenditures for expansion and replacement in addition to mandatory expenditures for a variety of other purposes such as taxes, donations, repayments of loans, dividends, and so on must be taken into account. The major items of payments are:

- payment for various inputs like materials, labour and machinery;
- payment of loans and deposits;
- redemption of capital and debentures; and
- investments.

The difference between cash receipts and payments represents *cash overage* or *shortage*. If a shortage exists, the company will have to arrange the cash through bank loans or other financing methods. If an excess exists, funds borrowed in previous period can be repaid, or the idle funds can be temporarily invested.

How frequently cash budget should be prepared and the time intervals covered by the budget depend on the individual company's circumstances, problems and objective. However, cash budget should be broken down into time periods that are as short as feasible. Many organizations maintain cash budgets on a weekly basis and even some prefer to do it on daily basis. But firms prefer to have case budgets on a monthly basis. However, a firm might be interested to prepare a cash budget every quarter if it is considering expansion.

Cash budgets may be prepared in three ways with varying formats and appearances. However, all forms require the same estimates and result in the same forecast. The methods are

- Receipt and payment method;
- Adjusted profit and loss method; and
- Balance sheet method.

Receipt and Payment Method: This method is a line-by-line estimate of receipts and payments. A good starting point for developing the cash budget is the opening cash balance to which expected cash receipts during the budget period are added. The figure so obtained is reduced by the amount of cash payment that is planned for the budget period. The outstanding payments and receipts are excluded from cash budget as this method is based on the concept of actual cash flows rather than on their accrual. Accordingly pre-payments and pre-receipts are to be

NOTES

considered in the preparation of cash budget. The receipt and payment method of cash budget is demonstrated in Illustration 2.6.

Illustration 2.6 Prepare a cash budget for the first four months from the following estimated revenue and expenses:

Month	*Sales* (₹)	*Purchase* (₹)	*Labour (Wages)* (₹)	*Overhead Administrative* (₹)	*Overhead Distribution* (₹)
April	60,000	60,000	12,000	2,000	1,200
May	66,000	42,000	14,000	2,200	1,400
June	72,000	40,000	16,000	2,200	1,400
July	78,000	36,000	18,000	2,400	1,600
August	84,000	34,000	20,000	2,600	1,600

Additional Information:

(i) Cash balances on 1st April was ₹ 35,000.

(ii) 50 per cent of sales are on credit basis which are realised in the subsequent month.

(iii) Suppliers are paid in the month following the month of supply.

(iv) Delay in payment of wages and overheads is 30 days.

(v) Dividends on investments amounting ₹ 10,000 may be received in April and July.

(vi) Company plans to purchase a machine for ₹ 60,000 for which it has to pay the consideration in three equal instalments in the month of April, June and July.

Solution:

Cash Budget
for the Period April to July

Details	*April* (₹)	*May* (₹)	*June* (₹)	*July* (₹)
A. *Balance b/d*	35,000	55,000	42,800	32,200
B. *Receipts:*				
Cash sales (50 per cent)	30,000	33,000	36,000	39,000
Debtors	—	30,000	33,000	36,000
Dividends	10,000	—	—	10,000
Total (A + B)	75,000	1,18,000	1,11,800	1,17,200
C. *Payments:*				
Creditors	—	60,000	42,000	40,000
Wages	—	12,000	14,000	16,000
Administrative overhead	—	2,000	2,200	2,200
Distribution overhead	—	1,200	1,400	1,400
Machine	20,000		20,000	20,000
Total C	20,000	75,200	79,600	79,600
Balance (A + B – C)	55,000	42,800	32,200	37,600

Adjusted Profit and Loss Method: Under this method, the profit forecast for the budget period is adjusted for non-cash transactions and for expected changes in assets and liabilities not involved in the calculation of profit. Thus, net estimated

profit for the budget period is increased by the amount of no-cash transactions like depreciation, provisions, outstanding expenses, and so on, which in turn is added by capital receipts, reduction in assets and increase in liabilities to form total cash receipts. The amount so calculated is reduced by the amount resulting from payment of dividends, pre-payments, increase in assets and decrease in liabilities. The resultant figure will be the amount of cash available at the end of the budget period. The top management always prefers to use adjusted profit and loss for cash forecasting but most firms are compelled to use the line-by-line estimate to provide the detailed information needed by lower management levels for control. The essential information for the preparation of adjusted profit and loss account is collected from profit and loss account and balance sheet. Illustration 2.7 will demonstrate the process of preparation of cash budget as per adjusted profit and loss account method.

Illustration 2.7 The following data is made available to you to prepare a cash budget under the adjusted profit and loss method:

Balance Sheet
as on 31st March 2012

Liabilities	(₹)	*Assets*	(₹)
Share capital	2,00,000	Building	1,25,000
Debentures	75,000	Machinery	75,000
Reserves	35,000	Furniture & fixtures	55,000
Profit & loss a/c	20,000	Debtors	25,000
Creditors	60,000	Bills receivable	20,000
Bills payable	20,000	Closing stock	45,000
		Bank balances	65,000
	4,10,000		4,10,000

Projected Trading and Profit and Loss Account
for the Year Ending 31st March, 2013

Particulars	(₹)	*Particulars*	(₹)
To Opening stock	35,000	By Sales	4,20,000
To Purchases	2,20,000	By Closing stock	85,000
To Carriage	12,000		
To Gross profit c/d	2,38,000		
	5,05,000		5,05,000
To Establishment	1,00,000	By Gross Profit b/d	2,38,000
To Discount	12,000	By Commission	12,000
To Administrative Exp.	38,000	By Interest	10,000
To Distribution Exp.	22,000		
To Depreciation on machinery	16,000		
To Advertisement	18,000		
To Net profit c/d	54,000		
	2,60,000		2,60,000
To Dividends	22,000	By Balance of profit from last year	20,000
To Balance c/d	52,000	By Net profit b/d	54,000
	74,000		74,000

NOTES

The following closing balance of certain items as on 31st March 2013 are also given as additional information:

Share capital	₹ 2,40,000
Debentures	₹ 90,000
Building	₹ 1,40,000
Machinery	₹ 80,000
Bills payable	₹ 25,000

Solution:

Cash Budget

	(₹)	(₹)
Cash balances as on 1st April, 2012		65,000
Additions to cash:		
Net profit of the year	54,000	
Depreciation	16,000	
Issue of share capital	40,000	
Issue of debentures	15,000	
Increase in B/P	5,000	1,30,000
Cash available		1,95,000
Deduction of cash:		
Dividends paid	22,000	
Purchase of buildings	15,000	
Purchase of machinery	5,000	
Increase in stock	40,000	82,000
Closing balance as on 31st March, 2013		1,13,000

Balance Sheet Method: Under this method the cash balances at the end is computed with the help of a projected balance sheet. The projected balance sheet begins with the current balance sheet and the same is adjusted in accordance with the data contained in the other budgets. All the balance sheet items except cash balances are adjusted in the light of changes that might take place between current balance sheet and the projected balance sheet. The difference between projected assets and projected liabilities represents cash balance.

Check Your Progress

3. What is a capital budget?
4. Which type of budget is also called a comprehensive budget?
5. What is included in a production cost budget?
6. Name the three methods of preparing a cash budget.

2.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

NOTES

1. The budgetary control requires preparation and designing of the budgets revealing clearly the financial responsibilities of executives in relation to the requirements of the overall policy of the company followed by a continuous comparison of actual business results with budgeted results to secure the objectives of the company's policy.
2. Budgetary control helps organizations eliminate the danger of over capitalization and under capitalization by determine the total capital requirements of a business from with the help of production budget and working capital estimates.
3. Capital budget is a plan reflecting the investments of the business in fixed assets and often includes amounts for large expenditure that have a long-term impact on the firm's financial position and growth.
4. A master budget is sometimes called the comprehensive budget.
5. A production cost budget includes the summaries of direct material budget, direct labour budget and manufacturing overhead budget.
6. The three methods of preparing a cash budget are receipt and payment method, adjusted profit and loss method and the balance sheet method.

2.5 SUMMARY

- Commercial organizations always aim to attain the highest volume of sales at the minimum cost in order to maximize their profits. To attain this objective, organizations need to realize that planning and control of activities become essential absolutely. It is, in fact, the system of budgetary control that provides the organizations with the framework which helps them to achieve this objective.
- Budgetary control is a systematic process designed to plan and control the major activities of a firm's business through budgets prepared in advance with an objective to ensure effective use of resources.
- Budgetary control consists of preparation of budgets for major activities of the business; measurement and comparison of actual results with budgeted targets, computation of deviation and revision of budget.
- The objectives of budgetary control includes providing accurate information to the managers, helping the control of costs, eliminating the danger of over capitalization and under capitalization, locating deficiencies in the production system and promoting research and developmental activities.

NOTES

- Benefits of budgetary control includes help in the coordinating of planning of the executive functions, motivating the executives, self-evaluation of managers, predetermination of benefits and costs, conserving resources, and increase of participation of employees etc.
- Limitations of budgetary control consists of doubtful data due to approximation and personal judgements, high costs, over consumption of time, slow adaptation to the changing business conditions etc.
- Budget is generally recognized as a plan of action to be pursued by an organization during a defined period of time in order to achieve its objectives. It is a statement of anticipated results expressed either in financial or non-financial terms.
- While preparing a budget, certain factors must be considered. This includes complete knowledge of objectives, determination of the duration of the budget, availability of competent and experienced budget managers, ensuring the making of elastic and flexible budgets, realistic aims.
- Different authorities have given different classifications of budgets. Some classify them on the basis of functions involved, period covered, nature of transactions while others classify them according to activity levels.
- Budgets according to activity levels include fixed budget and flexible budget. Classification on the basis of nature of transactions includes operating budget and capital budget. Period classification consists of long term and short term budgets. Functional classification includes master and subsidiary budget.
- The preparation of master budget involves the preparation of sales budget, production of cost budget, cost budget, cash budget, projected profit and loss account on the basis of information collected from the above stated four steps; and projected balance sheet from the information available in last year's balance sheet and with the help of the steps stated above.
- A subsidiary budget requires the preparation of sales budget, cash budget, production cost budget, materials budget, labour budget, manufacturing overhead budget, expenses budget, and plant budget.

2.6 KEY WORDS

- **Budget:** It is a plan of action to be pursued by an organization during a defined period of time in order to achieve its objectives. It is a statement of anticipated results expressed either in financial or non-financial terms.
- **Budgetary control:** It is a systematic process designed to plan and control the major activities of a firm's business through budgets prepared in advance with an objective to ensure effective use of resources.
- **Budget centre:** It is a section of the organization of an undertaking defined for the purpose of budgetary control.

2.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

NOTES

Short Answer Questions

1. What are the objectives of budgetary control system?
2. What the factors that must be kept in mind while preparing a budget?
3. Describe the classification of budgets.
4. State the essential characteristics of a good budgetary control system.

Long Answer Questions

1. Discuss the benefits and limitation of a budgetary control system.
2. Explain the ways in which a cash budget is prepared.
3. Chennai Engineering Co. Ltd manufactures two products *X* and *Y*. An estimate of number of units expected to be sold in the first seven months of 2018 is given below.

	Product X	*Product Y*
January	500	1,400
February	600	1,400
March	800	1,200
April	1,000	1,000
May	1,200	800
June	1,200	800
July	1,000	900

It is anticipated that:

(*a*) there will be no work-in-progress at the end of any month:

(*b*) finished units equal to half the anticipated sales for the next month will be in stock at the end of each month (including December 2017) The budgeted production and production costs for the year ending 31 December 2018 are as follows:

	Product X ₹	*Product Y* ₹
Production (units)	11,000	12,000
Direct materials per unit	12	19
Direct wages per unit	5	7
Other manufacturing charges apportionable to each type of product	33,000	48,000

You are required to prepare:

(*a*) A production budget showing the number of units to be manufactured each month.

(*b*) A summarized production cost budget for the 6-month period—January to June 2018.

2.8 FURTHER READINGS

NOTES

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 3 STANDARD COSTING

NOTES

Structure

3.0 INTRODUCTION

Standard costing is a specialized technique of cost management to control the cost. From the point of view of cost control, 'what a product should have costed' in more important than 'what it did actually cost'. Standard costing tells what the cost should be. As against standard costing, in historical costing only actual costs are ascertained. Historical costs are the actual costs which have been incurred in the past. Such costs are ascertained only after these have been incurred. In the initial stages of development of cost accounting, historical costing was the only system available for ascertaining costs. In this unit, you will learn about the concept of standard costing.

3.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning of standard costing
- Discuss the advantages and limitations of standard costing
- Describe the preliminaries and steps in setting up of standard costs
- Discuss the differences between budgetary control and standard costing and estimated cost

3.2 MEANING

Standard costing was introduced in 1920s as an alternative for the traditional or historical costing. So, to understand the meaning of standard costing, let's learn about the limitations of historical costing.

NOTES

A system of historical costing suffers from the following limitations:

1. ***No basis for cost control:*** Historical costs cannot be used for the purpose of cost control as the cost has already been incurred before the cost figures can become available to management.

2. ***No yardstick for measuring efficiency:*** Historical costs do not provide any yardstick against which efficiency can be measured. It only indicates the actual cost which is of little value in measuring performance efficiency.

3. ***Delay in availability of information:*** Cost data under historical costing is obtained too late and is not of much use in price quotations and production planning.

4. ***Expensive system:*** Historical costing is comparatively an expensive system of costing as it involves the maintenance of a larger volume of records.

The above given limitations of Historical costing encouraged the development of a more satisfactory standard costing approach based on predetermined costs. Standard costing is not an alternative system to job order on process costing. It is a special technique to control costs and can be used in conjunction with any other system like job costing, process costing or marginal costing.

Standard Costs and Budgeted Costs

The word standard means 'a norm' or a criterion. Standard cost is thus a criterion cost which may be used as a yardstick to measure the efficiency with which actual cost has been incurred. In other words, standard costs are predetermined costs or target costs that should be incurred under efficient operating conditions.

According to Chartered Institute of Management Accountants (CIMA), London, '*Standard cost is the predetermined cost based on technical estimates for materials, labour and overhead for a selected period of time for a prescribed set of working conditions'*.

In the words of Brown and Howard, '*the standard cost is a predetermined cost which determines what each product or service should cost under given circumstances*'. Thus standard costs are planned costs that should be attained under a given set of operating conditions. The main object of standard cost is to look forward and assess what the cost '*should be*' as distinct from what the cost has been in the past.

Budgeted Costs

In comparison to standard costs, budgeted costs reflect the projected revenues, costs and expenses. These are based on established forecasts and goals.

Concept of Standard Costing

Standard costing is simply the name given to a technique whereby standard costs are computed and subsequently compared with the actual costs to find out the differences between the two. These differences (known as variances) are then analysed to know the causes thereof so as to provide a basis of control. The CIMA, London has defined standard costing as '*the preparation of standard costs and applying them to measure the variations from actual costs and analysing the courses of variations with a view to maintain maximum efficiency in production.*' Brown and Howard have defined it, '*as a technique of cost accounting which compares the standard cost of each product or service with the actual costs, to determine the efficiency of the operations so that any remedial action may be taken immediately.*'

Steps: Standard costing system involves the following steps:

1. The setting of standard costs for different elements of cost, *i.e.,* material, labour and overheads.
2. Ascertaining actual costs.
3. Comparing standard with actual costs to determine the differences between the two, known as 'variances'.
4. Analysing variances for ascertaining reasons thereof.
5. Reporting of these variances and analysis thereof to management for appropriate action, where necessary.

Applicability of Standard Costing

The application of standard costing requires certain conditions to be fulfilled. These are:

(*a*) A sufficient volume of standard products or components should be produced.

(*b*) Methods, operations and processes should be capable of being standardized.

(*c*) A sufficient number of costs should be capable of being controlled.

Industries producing standardized products which are repetitive in nature, *i.e.,* industries using process costing method, fulfil all the above conditions and thus the system can be used to the best advantage in such industries. Examples are fertilizers, cement, steel and sugar.

In jobbing industries, it is not worthwhile to develop and employ a full system of standard costing. This is because in such industries each job undertaken may be different from another and setting standards for each job may prove difficult and expensive. In such industries, therefore, a partial system may be adopted in appropriate circumstances. For example, certain processes and operations performed may be of a repetitive nature and thus the principles of standard costing may be applied by setting standard for each such process or operation.

NOTES

3.2.1 Advantages and Limitations

The advantages to be derived from a system of standard costing will vary from one business to another. Much depends upon the degree of sophistication achieved and the acceptance by the management of utility of the system. Possible advantages are as follows:

1. **Effective cost control:** The most important advantage of standard costing is that it facilitates the control of costs. Control is exercised by comparing actual performance with standards and taking action on the basis of variances so revealed.
2. **Helps in planning:** Establishing standards is a very useful exercise in business planning which instils in management a habit of thinking in advance.
3. **Provides incentives:** Standards provide incentives and motivation to work with greater effort. Schemes may be formulated to reward those who achieve or surpass the standard. This increases efficiency and productivity.
4. **Fixing prices and formulating policies:** Standard costs are a valuable aid to management in determining prices and formulating production policies. For example, prices may be fixed by adding a standard margin of profit to standard cost. Similarly, standard costing furnishes cost estimates while planning production of new products.
5. **Facilitates delegation of authority:** In order that responsibility for off-standard performance may be identified directly with the persons concerned, an organization chart is prepared which shows delegated authority and establishes responsibility of each executive.
6. **Facilitates coordination:** While establishing standards, the performance of different departments, such as production, sales and purchases, is taken into account. Thus through the working of standard cost system, coordination of various functions is achieved.
7. **Eliminates wastes:** By fixing standard, certain wastes, such as material wastage, idle time and lost machine hours, are reduced.
8. **Valuation of stocks:** Standard costing simplifies the valuation of stock because the stock is valued at standard cost. The difference between standard and actual cost is transferred to a variance account. This ensures uniform pricing of stocks in the form of raw materials, work-in-progress and finished goods.
9. **Management by exception:** Reporting of variances is based on the principle of management by exception. Only variances beyond a predetermined limit may be considered by the management for corrective action. This also reduces the cost of preparing reports.
10. **Economical and simple:** Standard costing is an economical and simple means of cost accounting and generally results in savings in the cost of

costing system. It results in reduction in paperwork in accounting and needs fewer number of forms and records. This leads to considerable saving in clerical labour.

Limitations of Standard Costing

Standard costing system may suffer from certain disadvantages. This may be because of lack of education and communication and resultant misunderstanding on the part of managerial staff. Possible disadvantages are:

1. The system may not be appropriate to the business.
2. The staff may not be capable of operating the system.
3. A business may not be able to keep standards up-to-date. In other words, a business may not revise standards to keep pace with the frequent changes in manufacturing conditions. Firms may avoid revising standards as it is a costly affair.
4. Inaccurate and unreliable standards cause misleading results and thus may not enjoy the confidence of the users of the system.
5. Operation of the standard costing system is a costly affair and small firms cannot afford it.
6. Standard costing is expensive and unsuitable in job order industries which are manufacturing non-standardized products.

Check Your Progress

1. State the main object of standard cost.
2. What are budgeted costs based on?
3. Mention certain wastes which are reduced by the fixing standards.

3.3 PRELIMINARIES - STEPS IN SETTING UP OF STANDARD COSTS

In establishing a system of standard costing, there are a number of preliminaries to be considered. These are as follows:

1. Establishment of Cost Centres

The first step in the establishment of a system of standard costing is the establishment of cost centres with clearly defined areas of responsibility. The meaning of cost centre is explained in earlier units. In this context it may be noted that in establishing cost centres, there should be no doubt about the responsibility of each cost centre so that in case of off standard performance, responsibility may be identified.

NOTES

2. Classification of Accounts

Accounts are classified according to the purpose in hand. Classification may be by function, revenue item, etc. For speedy collection and analysis of accounts, codes and symbols may be used.

3. Types of Standards

Standards may be divided into the following two main classes—basic and current.

Basic standards: These are the standards which are established for an indefinite period of time. They are similar to an index number against which all later results are measured. Variances from basic standards show trends of deviation of the actual cost. However, basic standards are of no practical utility from the point of view of cost control.

Current Standards: Such standards remain in operation for a limited period and are related to current conditions. These standards are revised at regular intervals. Current standards are of three types: (*i*) Ideal standards; (*ii*) Expected standards; and (*iii*) Normal standards.

(*i*) **Ideal standard:** This is a theoretical standard which is rather not practicable to attain. It pre-supposes that the performance of men, materials and machines is perfect and thus makes no allowance for loss of time, accidents, machine breakdowns, wastage of materials and any other type of waste or loss. This ideal is obviously unrealistic and unattainable. Such a standard has the advantage of establishing a goal, which, though not attainable in practice, is always aimed at.

(*ii*) **Expected or practical standards:** This is a standard, which may be anticipated to be attained during a future period. Such standards are based on expected performance after making a reasonable allowance for unavoidable losses and other inevitable lapses from perfect efficiency. By far this is the most commonly used type of standard and is best suited from cost control point of view.

(*iii*) **Normal standards:** This is known as *Past Performance Standard* because it is based on the average performance in the past. The aim of such a standard may be to eliminate the variations in the cost which arise out of trade cycles.

4. Setting Standard Costs

The success of a standard costing system depends on the reliability, accuracy and acceptance of the standards. Extreme care, therefore, must be taken to ensure that all factors have been considered in the establishment of standards.

Standard costs are set for each element of cost, *i.e.*, direct materials, direct labour and overheads. These are described below:

NOTES

Setting standards for direct materials: Two standards are developed for material costs:

(*a*) Material price standard

(*b*) Material usage (or quantity) standard

(a) **Material price standard:** This is a forecast of the average prices of materials during the future period. This standard is quite difficult to establish because prices are regulated more by the external factors than by the company management. The purchasing department notifies the standard prices after considering factors like:

(*i*) Purchase prices of recent orders

(*ii*) Prices specified in the long-term contracts

(*iii*) Forecasts of the commodity price trends

Provision should be made for discounts, packing and delivery charges.

(*b*) **Material quantity (or usage) standard:** While setting quantity standard, the quality and size of material items to be consumed should be standardized. The standard is usually developed from material specifications prepared by the department of engineering of product design.

Setting standards for direct labour: The following two standards are usually established for direct labour costs:

(*a*) Labour rate standard

(*b*) Labour time standard

(*a*) **Labour rate standard:** This standard is determined having regard to the current rates of pay and any anticipated variations. Sometimes an agreement between trade unions and employer covers a number of future months or years. In such cases, the agreed rate should be adopted as the standard rate for the period.

Where workers are paid on time basis, it is necessary to establish:

(*i*) the labour time standard for each operation

(*ii*) the wage rate of each grade of labour

(*iii*) the grades of labour to be employed

The type of operation will determine the grade of labour to be employed—male or female, skilled, unskilled or semi-skilled.

Where workers are paid on piece basis, the standard cost will be a fixed rate per piece.

(*b*) **Labour time (or efficiency) standard:** Standard time for labour should be scientifically determined by time and motion studies, carried out in conjunction with a study to determine the most efficient method of working. Due allowance should be made for normal loss of labour time, like fatigue, idle time, tool setting, etc.

NOTES

Setting Standards for Direct Expenses: Direct expenses are not very common, but if there are any direct expenses relating to the cost unit, standards for these too must be set. Setting these standards is usually quite simple, as these may be based on past records, adjusted according to anticipated changes therein.

Setting Standards for Overheads: Setting standards for overheads is more complex than the development of material and labour standards. Developing this standard involves the following two distinct calculations:

(*a*) Determination of the standard overhead costs; and

(*b*) Determination of the estimates of production, *i.e.,* standard level of activity reduced to a common base, such as direct labour hours, units of production or machine hours.

A standard overheads absorption rate is computed with the use of these two figures by the following formula:

$$\text{Standard overhead rate (per hour)} = \frac{\text{Standard overhead cost for the period}}{\text{Standard hours for the period}}$$

or

$$\text{Standard overhead rate (per unit)} = \frac{\text{Standard overhead cost for the period}}{\text{Standard production (in units) for the period}}$$

Thus this rate may be per unit of production when base is in units of production and it will be per hour, if base is the number of hours.

An overall blanket rate of overheads absorption is rarely accurate in any costing system. Thus a separate rate should be computed for each cost centre (or department) created for this purpose.

Overhead standards will be more useful to management if they are divided to show fixed and variable components. Separate overheads absorption rates should be computed for these two types of overheads, *i.e.,* fixed overheads and variable overheads.

Standard Hour

Production may be expressed in diverse type of units such as kilograms, tonnes, litres, gallons, numbers, etc. When a company is manufacturing different types of products, it is almost impossible to aggregate the production, which cannot be expressed in the same unit. Therefore, it is essential to have a common unit in which the production, which is measured in different type of units, can be expressed. As time factor is common to all operations, a common practice is to express the various units in terms of time, known as *standard hour*. The standard hour is the quantity of output or amount of work which should be performed in one hour. In the words of CIMA, London, a standard hour is '*a hypothetical hour which represents the amount of work which should be performed in one hour under stated conditions.*' Time and motion studies may indicate what the output of each

process in one hour should be. For example, if 10 units of product should be produced in one hour, then an output of 200 units would represent 20 standard hours.

Standard Cost Card (Standard Cost Sheet)

NOTES

Once the standard costs have been established, these are recorded on a standard cost card. A standard cost card is thus a record of the standard material, labour and overhead costs. Such a card is maintained for each product or service. The card will normally show the quantity and price of each material item to be consumed, the time and rate of labour required, the overheads to be absorbed and the total cost. Costs shown in the card should be approved by the person who will be responsible for the operations concerned, otherwise he may not cooperate with much enthusiasm in attaining the standards.

A standard cost card with assumed Figures is given in Figure 3.1.

STANDARD COST CARD

Product: Component PLY–102 | Date of fixing standard: 1 Jan 2012
Unit: Dozen | Date of revision ....

	Rate ₹	*Deptt I* ₹	*Deptt II* ₹	*Total* ₹
Direct materials:				
4 units of material X	40	160	—	160
10 units of material Y	60	—	600	600
Total				760
Direct labour:				
Machine operator grade I				
10 hours	30	300	—	300
5 hours	30	—	150	150
Total				450
Factory overheads:				
Machine hour rate I 10 hrs	20	200	—	200
II 5 hrs	40	—	200	200
Total				400

Cost Summary

Direct materials	₹760
Direct labour	₹450
Factory overheads	₹400
Standard cost per unit	₹1,610

Fig. 3.1 *Standard Cost Card*

NOTES

3.4 DIFFERENCES BETWEEN BUDGETARY CONTROL AND STANDARD COSTING - ESTIMATED COST

Both standard costs and estimated costs are predetermined costs computed in advance of production. But their objectives are normally different. The differences between the two are summarized as under:

Table 3.1 *Standard Cost vs Estimated Cost*

Standard cost	*Estimated cost*
1. ***Nature*** Standard cost aims at what the cost SHOULD be.	Estimated cost is an assessment of what the cost WILL be.
2. ***Basis*** Standard costs are planned costs which are determined on a scientific basis after taking into account certain level of efficiency.	Estimated costs are based on average of the past figures, taking into consideration anticipated changes in future.
3. ***Relation to accounts*** In standard costing system, standard costs are usually incorporated into the accounts, from which variances of actual from standard are ascertained.	Estimated costs are used as statistical data for comparing with actual figures. Such costs are not entered in the books of accounts.
4. ***Use*** Standard costs are meant to be used for a concern operating on a standard costing system.	Estimated costs may be used in any concern operating on a historical cost system.
5. ***Purpose*** Standard costs serve the purpose of cost control.	Estimated costs do not serve the purpose of cost control. Such costs serve other purposes, like quoting selling price of new products, decision to buy or manufacture, etc.

Standard Costing *vs* Budgetary Control

Standard costing and budgetary control have the common objective of cost control by establishing predetermined targets. The actual performances are measured and compared with the predetermined targets for control purposes. Both the techniques are of importance in their respective fields and are complementary to each other.

Points of Similarity

There are certain basic principles which are common to both standard costing and budgetary control. These are:

1. The establishment of predetermined targets of performance
2. The measurement of actual performance
3. The comparison of actual performance with the predetermined targets
4. The analysis of variances between the actual and the standard performance
5. To take corrective measures, where necessary

Points of Difference

In spite of so much similarity between standard costing and budgetary control, there are some important differences between the two, which are as follows:

NOTES

Table 3.2 Standard Costing vs Budgetary Control

Standard costing	Budgetary control
1. ***Scope*** Standard costs are developed mainly for the manufacturing function and sometimes also for marketing and administration functions.	Budgets are compiled for different functions of the business such as sales, purchases, production, cash, capital expenditure, research and development.
2. ***Intensity*** Standard costing is intensive in application as it calls for detailed analysis of variances.	Budgetary control is extensive in nature and the intensity of analysis tends to be much less than that in standard costing.
3. ***Relation to accounts*** In standard costing, variances are usually revealed through accounts.	In budgetary control, variances are normally not revealed through accounts and control is exercised by statistically putting budgets and actuals side by side.
4. ***Usefulness*** Standard costs represent realistic yardsticks and, are therefore, more useful for controlling and reducing costs.	Budgets usually represent an upper limit on spending without considering the effectiveness of the expenditure in terms of output.
5. ***Basis*** Standard costs are usually established after considering such vital matters as production capacity, methods employed and other factors which require attention when determining an acceptable level of efficiency.	Budgets may be based on previous year's costs without any attention being paid to efficiency.
6. ***Projection*** Standard cost is a projection of cost accounts.	Budget is a projection of financial accounts.

Check Your Progress

4. List the two distinct calculations which is involved in setting standards for overheads.
5. What is the purpose of estimated costs?

3.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The main object of standard cost is to look forward and assess what the cost 'should be' as distinct from what the cost has been in the past.
2. Budgeted costs are based on established forecasts and goals.
3. By fixing standard, certain wastes, such as material wastage, idle time and lost machine hours, are reduced.

NOTES

4. Developing standards for overheads involves the following two distinct calculations:
   - Determination of the standard overhead costs; and
   - Determination of the estimates of production
5. Estimated costs do not serve the purpose of cost control. Such costs serve other purposes, like quote selling price of new products, decision to buy or manufacture, etc.

3.6 SUMMARY

- Standard costing is a specialized technique of cost management to control the cost.
- The limitations of historical costing encouraged the development of a more satisfactory standard costing approach based on predetermined costs.
- Standard costing is not an alternative system to job order on process costing. It is a special technique to control costs and costs and can be used in conjunction with any other system like job costing, process costing or marginal costing.
- Standard costing system may suffer from certain disadvantages. This may be because of lack of education and communication and resultant misunderstanding on the part of managerial staff.
- Establishing a system of standard costing: establishment of cost centres, classification of accounts, types of standards, and setting of standard costs.
- Standards may be divided into two main classes basic and current.
- Current standards are of three types: (i) ideal standards; (ii) expected standards; and (iii) normal standards.
- Standard costs are set for each element of cost: direct materials, direct labour and overheads.
- Standards for material costs include material price standard and material usage standard. Standards for labour include labour rate standard and labour time standard.
- Standards for overheads is more complex. An overall blanked rate of overhead absorption is rarely accurate in any costing system. Thus, a separate rate should be computed for each cost centre created for this purpose.
- The standard hour is the quantity of output or amount of work which should be performed in one hour.
- Once the standard costs have been established, these are recorded on a standard cost card.

- Standard costs aim at what the cost 'should' be and estimated cost in an assessment of what the cost 'will' be.
- Standard costs are developed mainly for the manufacturing function and sometimes also for marketing and administration functions. Budgets are compiled for different functions of the business such as sales, purchases, production, cash, capital expenditure, research and development.

NOTES

3.7 KEY WORDS

- **Historical costs:** These are the actual costs which have been incurred in the past.
- **Standard cost:** It refers to the predetermined costs or target costs that should be incurred under efficient operating conditions.
- **Standard hour:** It is a hypothetical hour which represents the amount of work which should be performed in one hour under stated conditions.
- **Standard cost card:** It shows the quantity and price of each material item to be consumed, the time and rate of labour required, the overheads to be absorbed and the total cost.

3.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. What are the limitations of historical costing?
2. Define standard and budgeted costs.
3. Write a short note on the applicability of standard costing.

Long Answer Questions

1. Discuss the advantages and limitations of standard costing.
2. Explain the steps involved in the establishment of standard costing.
3. Describe the process of setting standard costs.
4. Compare the concepts of standard cost, estimated cost, standard costing and budgetary control.

3.9 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

NOTES

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 4 VARIANCE ANALYSIS

NOTES

Structure

4.0 INTRODUCTION

Variance is the difference between actual costs and standard costs during an accounting period. It refers to variation of actual results with planned results. Variance analysis is a systematic process which analyses and interprets the variances. It refers to the breaking down of total variances into different components. In this unit, you will learn about the concept of variance analysis in detail.

In this unit, you will learn about the computation of variances and its attribution.

4.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the concept of variances
- Discuss material variances
- Examine labour variances
- Describe overhead variances

NOTES

4.2 MEANING, FAVOURABLE AND UNFAVOURABLE VARIANCES - CONTROLLABLE AND UNCONTROLLABLE VARIANCES

Variance analysis is the process of analysing variances by sub-dividing the total variance in such a way that management can assign responsibility for any off standard performance. According to CIMA, London, Terminology, variance analysis is the process of computing the amount of variance and isolating the causes of variance between actual and standard. An important aspect of variance analysis is the need to separate controllable from uncontrollable variances. A detailed analysis of controllable variances will help the management to identify the persons responsible for its occurrence so that corrective action can be taken.

The understanding of variance analysis requires certain basic concepts to be clear. Let's study these in this section.

Favourable and Unfavorable Variances

Where the actual cost is less than standard cost, it is known as *favourable* or *credit* variance. On the other hand, where the actual cost is more than standard cost, the difference is referred to as *unfavourable*, *adverse* or *debit* variance.

In simple words, any variance that has a favourable effect on profit is favourable variance and any variance which has an adverse or unfavourable effect on profit is unfavourable variance.

Many students experience difficulty in ascertaining whether a variance is favourable or adverse. In the formulae given in this book, positive (+) variance will indicate favourable variance and negative (–) variance will indicate adverse variance. Favourable variances will be designated by (*F*) and Adverse by (*A*).

Controllable and Uncontrollable Variances

If a variance can be regarded as the responsibility of a particular person, with the result that his degree of efficiency can be reflected in its size, then it is said to be a controllable variance. For example, excess usage of material is usually the responsibility of the foreman concerned. However, if the excessive usage is due to material being defective, the responsibility may rest with the Inspection Department for non-detection of the defects.

If a variance arises due to certain factors beyond the control of management, it is known as uncontrollable variance. For example, change in the market prices of materials, general increase in the labour rates, increase in the rates of power or insurance premium, etc., are not within the control of the management of the company. Responsibility for uncontrollable variances cannot be assigned to any person or department.

NOTES

The division of variances into controllable and uncontrollable is extremely important. The management should place more emphasis on controllable variance as it is these variances which require investigation and possibly corrective action. The uncontrollable variances, on the other hand, may be ignored. This follows the well known *principle of exception* whereby those matters which are going right are ignored and any deviations from efficient performance are investigated.

Methods Variance

While setting standards, specific methods of production are kept in view. If, for some reason or the other, a different method of production is adopted, it will give rise to a different amount of cost, thereby resulting in a variance. Such a variance is known as methods variance. Thus a methods variance arises due to the use of methods other than those specified. According to CIMA, London Terminology, methods variance is '*the difference between the standard cost of a product or operation, produced or performed by the normal method and the standard cost of a product or operation, produced or performed by the alternative method actually employed*.'

Revision Variance

After setting standards, sometimes standard cost has to be revised on account of unavoidable changes in prices of various factors like wages, materials, etc. The standard costs once set are not disturbed every now and then to account for these uncontrollable factors. Rather a revision variance is created and the basic standard cost is allowed to stand. This revision variance is the difference between the standard cost originally set and the revised standard cost.

Thus:

Revision Variance= Original standard cost of actual output= Revised standard cost of actual output

Creation of revision variance is only an interim adjustment which allows the standard costing system to operate usefully even when there are changes in standard costs.

Cost Variance and Sales Variance

Cost variance is the difference between a standard cost and the comparable actual cost incurred during a period (CIMA, London).

The total cost variance is divided into Material, Labour and Overheads variances. In the subsequent sections, you will learn about each of these types of variances in detail.

NOTES

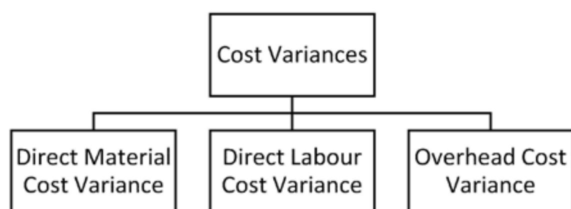


Fig. 4.1 *Attribution of Cost Variances*

Sales Variance

Two factors affect the value of sales: selling price and quantum of sales. The change in market conditions and demand of consumers are the factors which affect the sales variance. The methods of calculating sales variance include: (i) with reference to turnover and (ii) with reference to profit.

4.2.1 Uses of Variances

A variance represents the difference between an actual cost and its corresponding standard costs of material, labour and overheads. The variance is the measure of inefficiencies or efficiencies. The objectives of variance analysis are to:

- indicate whether costs are being kept under control.
- locate any apparent deficiency in cost control eff orts.
- facilitate the identification of the probable causes of deviation from standard.
- assign responsibility for deviations that may have occurred.

The following points highlight the importance and use of variances:

- It is one of the most important ingredients for making budgeting an effective exercise. This is because, planning for variances allows lower deviations when it comes to the planned budgets. Further, it helps the managers to make more comprehensive budgets.
- It is an effective tool in exercising greater control of different departments. As it reveals which departments need to have more responsibilities and take stock of their functioning.
- It also helps managers make a more forward-looking budgets and make useful forecasts and subsequently plan better strategies.
- The mathematical aspects makes the manager study demand much better and understand the competitive positioning in an effective manner.

Check Your Progress

1. What are the names used to refer to unfavourable variance?
2. Name the principle which is used in case of management's approach to controllable and uncontrollable variance.

4.3 ANALYSIS OF DIFFERENT TYPES OF VARIANCES

NOTES

In this section you will learn about the manner in which analysis of different types of variances is done.

4.3.1 Direct Material Cost Variance

Direct Material Cost Variance is the difference between the standard cost of direct materials specified for the output achieved and the actual cost of direct materials used. It is calculated as:

Material Cost Variance = Standard cost of actual output – Actual cost

$$MCV = SC - AC$$

or Material Cost Variance

$$= \begin{bmatrix}\text{Standard quantity} \\ \text{for actual output}\end{bmatrix} \times \begin{bmatrix}\text{Standard} \\ \text{price}\end{bmatrix} - \begin{bmatrix}\text{Actual} \\ \text{quantity}\end{bmatrix} \times \begin{bmatrix}\text{Actual} \\ \text{price}\end{bmatrix}$$

$$MCV = (SQ \times SP) - (AQ \times AP)$$

Example: A furniture company uses sunmica tops for tables. It provides the following data:

Standard quantity of sunmica per table	4 sq. ft
Standard price per sq. ft of sunmica	₹ 5
Actual production of tables	1,000
Sunmica actually used	4,300 sq. ft
Actual purchase price of sunmica per sq. ft	₹ 5.50

Material cost variance will be calculated as under:

$$MCV = (SQ \times SP) - (AQ \times AP)$$

$$MCV = (1{,}000 \times 4 \times ₹\,5) - (4{,}300 \times ₹\,5.50)$$

$$= 20{,}000 - 23{,}650$$

$$= 3{,}650\ (A)$$

The material cost variance may be further divided into price variance and usage variance.

Material Price Variance

This is '*that portion of the material cost variance which is due to the difference between the standard price specified and the actual price paid*'. It is calculated by the following formula:

Material Price Variance = (Standard price – Actual price) × Actual quantity

$$MPV = (SP - AP) \times AQ$$

NOTES

Thus, this is the difference between standard price and actual price multiplied by actual quantity.

Example: With the figures in Example given before, the material price variance will be calculated as follows:

$$MPV = (SP - AP) \times AQ$$
$$MPV = (5 - 5.50) \times 4{,}300$$
$$= ₹2{,}150 \text{ (A)}$$

Reasons for Material Price Variance: This variance usually arises due to the following reasons:

1. Change in the market prices of materials
2. Failure to purchase the specified quality, thereby resulting in a different price being paid
3. Change in the quantity of materials, thereby leading to lower/higher quantity discount
4. Not availing cash discounts, when standards set took into account such discounts.
5. Inefficient purchasing
6. Change in the delivery costs
7. Rush purchases
8. Purchase of a substitute material on account of non-availability of the material specified
9. Change in the rates of excise duty, purchase tax, etc.
10. Off-season purchasing for certain seasonal products, like jute, cotton, etc.

Material Usage (or Quantity) Variance

This is '*that portion of the material cost variance which is due to the difference between the standard quantity specified and the actual quantity used*'. Its formula is:

$$\text{Material Usage Variance} = \begin{pmatrix}\text{Standard quantity} \\ \text{for actual output}\end{pmatrix} - \begin{pmatrix}\text{Actual} \\ \text{quantity}\end{pmatrix} \times \begin{matrix}\text{Standard} \\ \text{price}\end{matrix}$$

$$MUV = (SQ - AQ) \times SP$$

Thus, this is the difference between standard quantity and actual quantity multiplied by the standard price.

Example: Continuing the aforementioned example, material usage variance will be calculated as under:

$$MUV = (SQ - AQ) \times SP$$
$$= (4{,}000 - 4{,}300) \times 5$$
$$= ₹1{,}500 \text{ (A)}$$

Reasons for Material Usage Variance: The material usage variance may be caused by some or all of the following reasons:

1. Use of defective or sub-standard materials
2. Carelessness in the use of materials
3. Pilferage
4. Poor workmanship
5. Defect in plant and machinery
6. Change in the design or specification of the product
7. Change in the quality of materials
8. Use of substitute materials
9. Use of non-standard material mixture
10. Yield from materials in excess of or less than standard yield

Check: The algebraic sum of material price variance and material usage variance should be equal to material cost variance. Thus:

$$MCV = MPV + MUV$$

$$3{,}650\ (A) = ₹2{,}150\ (A) + ₹1{,}500\ (A)$$

Illustration 4.1: From the following particulars, compute: (*a*) Material cost variance; (*b*) Material price variance; and (*c*) Material usage variance

Quantity of materials purchased	3,000 units
Value of materials purchased	₹9,000
Standard quantity of materials required per tonne of output	30 units
Standard rate of material	₹2.50 per unit
Opening stock of materials	Nil
Closing stock of materials	500 units
Output during the period	80 tonnes

Solution:

Basic Calculations:

Actual quantity of material purchased = 3,000 units

Value of materials purchased = ₹9,000

$$\text{Actual price per unit} = \frac{₹9{,}000}{3{,}000\text{ units}} = ₹3\text{ per unit}$$

Standard price = 2.50 per unit

Standard quantity = 80 tonnes × 30 units = 2,400 units

Actual quantity = Opening stock + Purchase – Closing stock

= Nil + 3,000 – 500 = 2,500 units

NOTES

Calculation of variances

(*a*) **Material Cost Variance** = $SC - AC$

= $(SQ \times SP) - (AQ \times AP)$

= $(2{,}400 \times 2.50) - (2{,}500 \times 3.00)$

MCV = **₹1,500 (A)**

(*b*) **Material Price Variance** = $(SP - AP) \times AQ$

= $(2.50 - 3.00) \times 2{,}500$

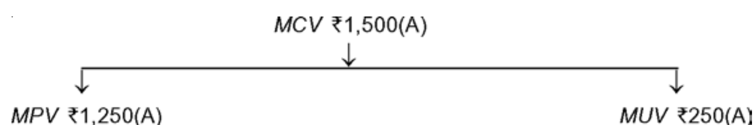
MPV = **₹1,250 (A)**

(*c*) **Material Usage Variance** = $(SQ - AQ) \times SP$

= $(2{,}400 - 2{,}500) \times 2.50$

MUV = **₹250 (A)**

Check:



Classification of Material Usage Variance

Material usage variance is further sub-divided into:

(*a*) Material mix variance

(*b*) Material yield variance (Or Material sub-usage variance)

(a) **Material Mix Variance:** This is sub-variance of material usage variance. It arises only where more than one type of material is used for producing the finished product. A company may be using a mixture of materials which does not comply with the predetermined standard mixture. This gives rise to material mix variance.

The material mix variance is defined as *that portion of the material usage variance which is due to the difference between standard and actual composition of materials.* It may arise in industries like chemicals, rubber, etc., where a number of raw materials are mixed to produce a final product. Change from the standard mix may be due to non-availability of one or more components of the mix or due to non-purchase of materials at proper time. Increase in the proportion of cheaper materials results in favourable mix variance and vice versa, the use of more expensive materials in larger proportion results in adverse variance.

This variance is calculated with the help of the following formula:

$$\text{Material mix variance} = \left(\begin{matrix}\text{Revised standard} \\ \text{quantity}\end{matrix} - \begin{matrix}\text{Actual} \\ \text{quantity}\end{matrix}\right) \times \begin{matrix}\text{Standard} \\ \text{price}\end{matrix}$$

$$MMV = (RSQ - AQ) \times SP$$

NOTES

The revised standard quantity is nothing but the standard proportion of total of actual quantities of all the materials. This is calculated as under:

$$RSQ = \frac{\text{Standard quantity of one material}}{\text{Total of standard quantities of all materials}} \times \begin{matrix}\text{Total of actual quantities}\\ \text{of all materials}\end{matrix}$$

(b) **Material Sub-usage (or Material Revised Usage) Variance:** This is a sub-variance of the material usage variance and represents that portion of the material usage variance which is attributed to reasons other than those which give rise to material mix variance. Thus the algebraic sum of this revised usage variance and material mix variance is equal to material usage variance. Its formula is:

$$\begin{matrix}\text{Material revised}\\ \text{usage variance}\end{matrix} = \left(\begin{matrix}\text{Standard}\\ \text{quantity}\end{matrix} - \begin{matrix}\text{Revised standard}\\ \text{quantity}\end{matrix}\right) \times \text{Standard price}$$

$$MRUV = (SQ - RSQ) \times SP$$

Material Yield Variance: This is also a sub-variance of material usage variance. It arises in process industries, like chemicals, where loss of materials in production is inevitable. While setting standards, the normal or standard loss is taken into account. But actual loss may differ from normal or standard loss. This results in actual yield or output being different from standard yield.

Thus material yield variance is that portion of the material usage variance which is due to the difference between standard yield specified and actual yield obtained. The standard yield is the output expected to be obtained from the actual usage of raw materials. It should be noted that yield variance as used in standard costing is the same thing as abnormal loss or abnormal gain in the other costing systems.

One important feature of yield variance which differentiates it from other material variances (price, usage and mix variances) is that yield variance is an *output variance*, while others are *input variances*. In other words, yield variance represents a gain or loss on output in terms of finished production, while other variances represent a gain or loss on the cost of material input. Its formula is given on the following page:

$$\begin{matrix}\text{Material Yield}\\ \text{Variance}\end{matrix} = \left(\begin{matrix}\text{Actual}\\ \text{yield}\end{matrix} - \begin{matrix}\text{Standard}\\ \text{yield}\end{matrix}\right) \times \begin{matrix}\text{Standard}\\ \text{Output Price}\end{matrix}$$

$$MYV = (AY - SY) \times SOP$$

Standard output price (*SOP*) is the standard material cost per unit of output.

Note: Material revised usage variance and Material yield variance are two different methods of calculating the same thing and are hence clubbed together.

Illustration 4.2: The standard mix to produce one unit of product is as follows:

Material *A*	60	units @ ₹15 per unit	=	900
Material *B*	80	units @ ₹20 per unit	=	1,600
Material *C*	100	units @ ₹25 per unit	=	2,500
	240	units		5,000

NOTES

During the month of April, 10 units were actually produced and consumption was as follows:

Material *A*	640	units @ ₹17.50 per unit	=	11,200
Material *B*	950	units @ ₹18.00 per unit	=	17,100
Material *C*	870	units @ ₹27.50 per unit	=	23,925
	2,460	units		52,225

Calculate all material variances.

Solution:

	Standard for 10 units			Actual for 10 units		
Material	*Qty units*	*Rate ₹*	*Amt ₹*	*Qty Units*	*Rate ₹*	*Amt ₹*
A	600	15	9,000	640	17.50	11,200
B	800	20	16,000	950	18.00	17,100
C	1,000	25	25,000	870	27.50	23,925
Total	2,400		50,000	2,460		52,225

1. **Material Cost Variance** = Standard cost – Actual cost

   = ₹50,000 – ₹52,225 (A)

   MCV = **₹2,225(A)**

2. **Material Price Variance**= (Std Price – Actual Price) × Actual Qty

   Material *A* = (15 – 17.50) × 640 = ₹1,600 (A)

   Material *B* = (20 – 18) × 950 = ₹1,900 (F)

   Material *C* = (25 – 27.50) × 870 = ₹2,175 (A)

   MPV = **₹1,875 (A)**

3. **Material Usage Variance**= (Std Qty – Actual Qty) × Std Price

   Material *A* = (600 – 640) × 15 = ₹600 (A)

   Material *B* = (800 – 950) × 20 = ₹3,000 (A)

   Material *C* = (1,000 – 870) × 25 = ₹3,250 (F)

   MUV = **₹350 (A)**

   Check: *MCV* = *MPV* + *MUV*

   ₹2,225 (A) = ₹1,875 (A) + ₹350 (A)

4. **Material Mix Variance**= (Revised Std Qty – Actual Qty) × Std Price

   Material *A* = (615* – 640) × 15 = ₹375 (A)

   Material *B* = (820* – 950) × 20 = ₹2,600 (A)

   Material *C* = (1,025* – 870) × 25 = ₹3,875 (F)

   MMV = **₹900 (F)**

NOTES

*Revised Standard Quantity (RSQ) is calculated as follows:

$$\text{Material } A = \frac{2,460}{2,400} \times 600 = 615 \text{ units}$$

$$\text{Material } B = \frac{2,460}{2,400} \times 800 = 820 \text{ units}$$

$$\text{Material } C = \frac{2,460}{2,400} \times 1,000 = 1,025 \text{ units}$$

5. **Material Yield Variance**

For yield variance, certain basic calculations have to be made as follows:

$$\text{Standard yield} = \frac{\text{Actual usage of materials}}{\text{Standard usage per unit of output}} = \frac{2,460}{240} = 10.25 \text{ units}$$

SOP (Std material cost per unit of output)= ₹50,000 ÷ 10 units= ₹5,000

Material Yield Variance = $(AY - SY) \times SOP$

MYV = (10 – 10.25) × 5,000 = **₹1,250(A)**

Material Revised Usage (or Sub-usage) Variance (MRUV)

= (Standard Quantity – Revised Standard Quantity) × Standard Price

Material *A* = (600 – 615) × 15 = ₹225 (A)

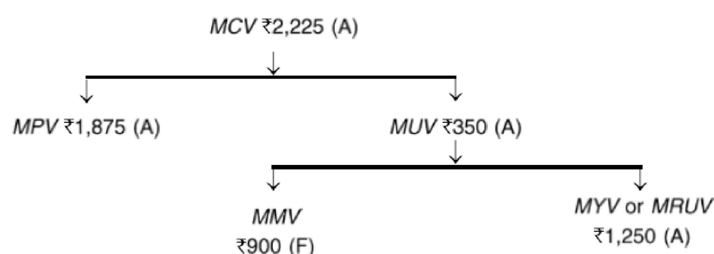
Material *B* = (800 – 820) × 20 = ₹400 (A)

Material *C* = (1,000 – 1,025) × 25 = ₹625 (A)

MRUV =**₹1,250 (A)**

Note: Either MMV or MRUV is calculated. These two are always equal.

Check:



4.3.2 Direct Labour Cost Variance

The analysis and computation of labour variances is quite similar to material variances.

Labour Cost Variance

This is the difference between the standard direct labour cost specified for the activity achieved and the actual direct labour cost incurred. It is calculated as under:

$$\text{Labour Cost Variance} = \frac{\text{Std labour cost}}{\text{of actual output}} - \frac{\text{Actual labour}}{\text{cost}}$$

$$LCV = SC - AC$$

NOTES

Or, Labour Cost Variance

$$= \left(\frac{\text{Std hours}}{\text{for actual output}} - \frac{\text{Std rate}}{\text{per hour}}\right) - \left(\frac{\text{Actual}}{\text{hours}} - \frac{\text{Actual rate}}{\text{per hour}}\right)$$

$$LCV = (SH \times SR) - (AH \times AR)$$

Example: The following information is given:

Standard hours per unit	15
Standard rate	₹4 per hour
Actual data:	
Actual production	1,000 units
Actual hours	15,300 hours
Actual rate	₹3.90 per hour

Calculate labour cost variance.

Solution:

Labour Cost Variance $= (SH\ for\ actual\ output \times SR) - (AH \times AR)$

$= (1{,}000 \times 15 \times 4) - (15{,}300 \times 3.90)$

LCV = **₹330 (F)**

Classification of Labour Cost Variance

Labour cost variance is further divided into rate variance and efficiency variance.

Labour Rate Variance: This is that portion of the labour cost variance which is due to the difference between the standard rate of labour specified and the actual rate paid. Its formula is:

Labour Rate Variance = (Standard rate – Actual rate) × Actual hours

$$LRV = (SR - AR) \times AH$$

Thus, this is the difference between standard and actual rates of wages, multiplied by actual hours.

Example: Using the data given in the above example:

$LRV = (SR - AR) \times AH$

$= (4 - 3.90) \times 15{,}300 =$ **₹1,530 (F)**

Reasons for labour rate variance: Usual reasons are:

1. Change in the basic wage rates
2. Use of a different method of wage payment
3. Employing workers of grades different from the standard grades specified

4. Unscheduled overtime
5. New workers not being paid at full rates

Often, labour rate variance will be an uncontrollable variance as labour rates are usually determined by demand and supply conditions in the labour market, backed by negotiable strength of the trade union. Where this variance is due to the use of a grade of labour other than that specified, there may well be such acceptable explanations as non-availability of the labour grade specified. But when a foreman carelessly employs a wrong grade of labour on a job, he may be held responsible.

NOTES

Labour Time (or Efficiency) Variance: This is that portion of the labour cost variance which is due to the difference between labour hours specified for actual output and the actual labour hours expended. This variance is calculated as follows:

$$\text{Labour Efficiency Variance} = \left(\begin{matrix}\text{Std hours for} \\ \text{actual output}\end{matrix} - \begin{matrix}\text{Actual} \\ \text{hours}\end{matrix}\right) \times \text{Standard rate}$$

$$LEV = (SH - AH) \times SR$$

Thus, this variance is the difference between standard and actual time valued at standard rate.

Example: Using the data given in above example:

$$LEV = (SH\ for\ actual\ output - AH) \times SR$$
$$= (15{,}000 - 15{,}300) \times 4 = ₹1{,}200\ (A)$$

The algebraic total of labour rate variance and labour efficiency variance is equal to labour cost variance. Thus:

$$LCV = LRV + LEV$$
$$₹330\ (F) = ₹1{,}530\ (F) + ₹1{,}200\ (A)$$

Reasons for labour efficiency variance: This variance is usually caused by one or more of the following reasons:

1. Poor working conditions, *e.g.,* inadequate lighting and ventilation, excessive heating, etc.
2. Defective tools and plant and machinery
3. Inefficient workers
4. Incompetent supervision
5. Use of defective or non-standard materials
6. Time wasted by factors, like waiting for materials, tools or machine break-down
7. Insufficient training of workers
8. Change in the method of operation
9. Non-standard grade of workers

Classification of Labour Efficiency Variance

Labour efficiency variance is further divided into the following sub-variances:

(*a*) Idle time variance

(*b*) Labour mix variance

(*c*) Labour yield variance (or Labour revised efficiency variance)

(a) **Idle Time Variance:** This variance represents that portion of the labour efficiency variance which is due to abnormal idle time, such as time lost due to machine break-down, power failure, strike, etc. It is calculated by valuing idle hours at standard rate. Thus:

$$\text{Idle Time Variance} = \text{Idle hours} \times \text{Standard rate}$$

$$ITV = IH \times SR$$

As idle hours represent a loss, idle time variance is always unfavourable.

Some accountants do not treat Idle Time Variance as a part of labour efficiency variance but treat it as a part of labour cost variance.

Example: Using the data give in the above example and further assuming that idle time is 200 hours, then the idle time variance would be:

$$ITV = 200 \times 4 = ₹800\ (A)$$

When idle time variance is treated as a sub-variance of labour cost variance and not of labour efficiency variance, then for labour efficiency variance, the actual time would be 15,300 – 200 = 15,100 hours. Labour efficiency variance will be calculated on the basis of 15,100 hours. Thus

$$\text{Labour Efficiency Variance} = (SH - AH) \times SR$$
$$= (15{,}000 - 15{,}100) \times 4 = ₹400\ (A)$$

In this case, the total of Labour Rate Variance, Labour Efficiency Variance and Idle Time Variance would be equal to Labour Cost Variance. Thus

$$LCV = LRV + LEV + ITV$$
$$330\ (F) = 1{,}530\ (F) + 400\ (A) + 800\ (A)$$

(b) **Labour Mix Variance (Gang Composition Variance):** This variance is similar to material mix variance. It arises only when more than one grade of workers are employed and the composition of actual grade of workers differs from those specified. It is calculated with the help of following formula:

$$\text{Labour Mix Variance} = \left(\begin{matrix}\text{Revised standard}\\ \text{hours}\end{matrix} - \begin{matrix}\text{Actual}\\ \text{hours}\end{matrix}\right) \times \text{Standard rate}$$

$$LMV = (RSH - AH) \times SR$$

Illustration 4.3: Coates India Ltd manufactures a particular product, the standard direct labour cost of which is ₹120 per unit, whose manufacture involves the following:

Grade of workers	*Hours*	*Rate* ₹	*Amount* ₹
A	30	2	60
B	20	3	60
	50		120

During a period, 100 units of the product were produced, the actual labour cost of which was as follows:

Grade of workers	*Hours*	*Rate* ₹	*Amount* ₹
A	3,200	1.50	4,800
B	1,900	4.00	7,600
	5,100		12,400

Calculate (*a*) Labour Cost Variance (*b*) Labour Rate Variance
(*c*) Labour Efficiency Variance (*d*) Labour Mix Variance

Solution: During the month of May, the following data applies:

Grade of worker	*Standard for 100 units*			*Actual for 100 units*		
	Hours	*Rate* ₹	*Amt* ₹	*Hours*	*Rate* ₹	*Amt* ₹
A	3,000	2	6,000	3,200	1.50	4,800
B	2,000	3	6,000	1.900	4.00	7,600
Total	5,000		12,000	5,100		12,400

(*a*) **Labour Cost Variance** = *SC – AC*

LCV = 12,000 – 12,400 = **₹400 (A)**

(*b*) **Labour Rate Variance** = *(SR – AR)* × *AH*

A = (2 – 1.50) × 3,200 = ₹1,600 (F)

B = (3 – 4.00) × 1,900 = ₹1,900 (A)

LRV = **₹300 (A)**

(*c*) **Labour Efficiency Variance** = (*SH – AH*) × *SR*

A = (3,000 – 3,200) × 2 = ₹400 (A)

B = (2,000 – 1,900) × 3 = ₹300 (F)

LEV = **₹100 (A)**

Check: *LCV* = *LRV* + *LEV*

400 (A) = 300(A) + 100(A)

NOTES

(*d*) **Labour Mix Variance** $= (RSH^* - AH) \times SR$

A	$= (3{,}060 - 3{,}200) \times 2$	=	₹280 (A)
B	$= (2{,}040 - 1{,}900) \times 3$	=	₹420 (F)
		LMV =	**₹140 (F)**

*Calculation of Revised Standard Hours (RSH)

$$RSH = \frac{\text{Std hours of the grade}}{\text{Total std hours}} \times \text{Total actual hours}$$

$$\text{Grade } A = \frac{3{,}000}{5{,}000} \times 5{,}100 = 3{,}060 \text{ hrs} \quad \text{Grade } B = \frac{2{,}000}{5{,}000} \times 5{,}100 = 2{,}040 \text{ hrs}$$

(c) **Labour Revised Efficiency Variance (Or Labour Sub-efficiency Variance):** This is similar to Material Revised Usage Variance and is a sub-variance of labour efficiency variance. It arises due to factors other than those which give rise to idle time variance and labour mix variance. Thus, this is a residue of labour efficiency variance left after idle time and mix variance have been separated. Its formula is:

$$\text{Labour Revised Efficiency Variance} = \left(\begin{matrix}\text{Std hours for}\\ \text{actual output}\end{matrix} - \begin{matrix}\text{Revised}\\ \text{std hours}\end{matrix}\right) \times \text{Std rate}$$

$$LREV = (SH - RSH) \times SH$$

Labour Yield Variance: This is quite similar to Material Yield Variance. This variance reveals the effect on labour cost of actual output or yield being more or less than the standard yield. Its formula is:

$$\text{Labour Yield Variance} = \left(\begin{matrix}\text{Actual}\\ \text{yield}\end{matrix} - \begin{matrix}\text{Std yield}\\ \text{from actual input}\end{matrix}\right) \times \begin{matrix}\text{Std labour cost}\\ \text{per unit of output}\end{matrix}$$

Note: Labour revised efficiency variance and Labour yield variance are two methods of calculating the same thing, and are hence clubbed together.

Illustration 4.4: The standard labour employment and the actual labour engaged in a week for a job are as under:

	Skilled workers	*Semi-skilled workers*	*Unskilled workers*
Standard no. of workers in the gang	32	12	6
Actual no. of workers employed	28	18	4
Standard wage rate per hour	3	2	1
Actual wage rate per hour	4	3	2

During the 40 hours working week, the gang produced 1,800 standard labour hours of work. Calculate:

(*a*) Labour Cost Variance
(*b*) Labour Rate Variance
(*c*) Labour Efficiency Variance
(*d*) Labour Mix Variance
(*e*) Labour Yield Variance

NOTES

Solution:

Category of workers	Standard Hrs*	Standard Rate ₹	Standard Amount ₹	Actual Hrs*	Actual Rate ₹	Actual Amount ₹
Skilled	1,280	3	3,840	1,120	4	4,480
Semi-skilled	480	2	960	720	3	2,160
Unskilled	240	1	240	160	2	320
	2,000		5,040	2,000		6,960

*Hrs = No. of workers × 40 hours.

Std cost of actual output = $\frac{₹5{,}040}{2{,}000 \text{ hrs}} \times 1{,}800$ hrs = ₹4,536

Labour Cost Variance = Std cost of actual output – Actual cost

LCV = ₹4,536 – 6,960 = **₹2,424 (A)**

Labour Rate Variance = (*SR* – *AR*) × *AH*

Skilled = (3 – 4) ×1,120 = ₹1,120 (A)

Semi-skilled = (2 – 3) × 720 = ₹720 (A)

unskilled = (1 – 2) × 160 = ₹160 (A)

LRV = **₹2,000 (A)**

Labour Efficiency Variance = (**SH for actual output* – *AH*) × *SR*

Skilled = (1,152 – 1,120) × 3 = ₹96 (F)

Semi-skilled = (432 – 720) × 2 = ₹576 (A)

Unskilled = (216 – 260) × 1 = ₹56 (F)

LEV = **₹424 (A)**

*Std hrs for actual output are calculated as follows:

Skilled = $\frac{1{,}800}{2{,}000} \times 1{,}280$ = 1,152 hrs

Semi-skilled = $\frac{1{,}800}{2{,}000} \times 480$ = 432 hrs

Unskilled = $\frac{1{,}800}{2{,}000} \times 240$ = 216 hrs

Labour Mix Variance = (*Revised std hrs* – *AH*) × *SR*

Skilled = (1,280 – 1,120) × 3 = ₹480 (F)

Semi-skilled = (480 – 720) × 2 = ₹480 (A)

Unskilled = (240 – 160) × 1 = ₹80 (F)

LMV = **₹80 (F)**

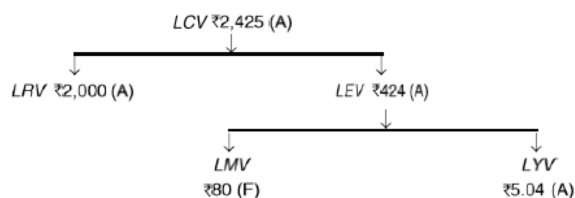
Labour Yield Variance

$= \left(\text{Actual output} - \text{Std output for actual hours}\right) \times$ *Std rate per hour of work

LYV = (1,800 – 2,000) × $\frac{5{,}040}{2{,}000}$ = **₹504 (A)**

NOTES

Check:



4.3.3 Overhead Variance

Overhead cost is the aggregate of indirect materials, indirect labour and indirect expenses. Analysis of overheads variances is different from that of direct material and direct labour variances and is considered to be a difficult part of variance analysis. There are mainly two reasons for this difficulty. *Firstly*, standard overhead rate for fixed overheads is difficult to establish because changes in the volume of output will distort this rate, even though there is no change in the amount of fixed overhead cost. Generally fixed overheads absorption rate is determined on the basis of normal volume of output. *Secondly,* there is conflicting terminology and different ways of computing overheads variances. Overheads variances may be separately computed for fixed overheads and variable overheads. Then there are two variance, three variance and four variance methods of analysing overheads variances. Moreover, overhead rate may be per hour or per unit of output. All these lead to confusion in overheads variance analysis.

In this book, overheads variances have been classified into fixed and variable overheads variances and then further analysed according to causes.

It is important to understand at the outset that overheads variance is nothing but under or over-absorption of overheads. Certain basic terms used in connection with overheads variances are explained first of all.

Standard Overhead Rate: This standard overheads absorption rate may be computed per hour or per unit, depending upon the method of absorption. This is calculated as follows:

$$\text{Standard overhead rate (per hour)} = \frac{\text{Budgeted overheads}}{\text{Budgeted hours}}$$

Or $$\text{Standard overhead rate (per unit)} = \frac{\text{Budgeted overheads}}{\text{Budgeted output (in units)}}$$

Where overheads variances are separately computed for fixed and variable overheads, separate overhead rates are to be computed for fixed overheads and variable overheads.

NOTES

When Overhead Rate per Hour is Used

The following basic calculations should be made before computing variances:

(*a*) Standard hours for actual output (*SHAO*): It is required to be calculated when overheads are absorbed on the basis of overhead rate per hour. It is calculated as under:

$$\text{SHAO} = \frac{\text{Budgeted hours}}{\text{Budgeted output}} \times \text{Actual output}$$

(*b*) Absorbed (or Recovered) overheads $= \text{Std hrs for actual output} \times \text{Std overhead rate per hour}$

(*c*) Standard overheads $= \text{Actual hours} \times \text{Std overhead rate per hour}$

(*d*) Budgeted overheads $= \text{Budgeted hours} \times \text{Std overhead rate per hour}$

(*e*) Actual overheads $= \text{Actual hours} \times \text{Actual overhead rate per hour}$

When Overhead Rate per Unit is used

The following basic calculations should be made:

(*a*) Standard output for actual hours (*SOAH*): It is required to be calculated when overheads are absorbed on the basis of overhead rate per unit. It is calculated as follows:

$$SOAH = \frac{\text{Budgeted output (in units)}}{\text{Budgeted hours}} \times \text{Actual hours}$$

(*b*) Absorbed overheads $= \text{Actual output} \times \text{Std overhead rate per unit}$

(*c*) Standard overheads $= \text{Std output for actual time} \times \text{Std overhead rate per unit}$

(*d*) Budgeted overheads $= \text{Budgeted output} \times \text{Std overhead rate per unit}$

(*e*) Actual overheads $= \text{Actual output} \times \text{Actual overhead rate per unit}$

Overhead Cost Variance

This is the total overheads variance and can be described as the difference between total standard overheads absorbed and total actual overheads incurred. CIMA, London has defined it as '*the difference between the standard cost of overheads absorbed in the output achieved and the actual overhead cost.*' Thus, this variance arises due to the actual overhead incurred differing from the standard overheads absorbed and is simply under or over-absorption of overheads. Its formula is:

Overhead Cost Variance = Absorbed overheads – Actual overheads

$$OCV = \left(\begin{matrix}\text{Std hours for}\\ \text{actual output}\end{matrix} \times \begin{matrix}\text{Std overheads}\\ \text{absorption rate}\end{matrix}\right) - \text{Actual overheads}$$

NOTES

Variable overheads (V.O.) Variances

Variable Overhead Cost Variance: It may be defined as the difference between absorbed variable overheads and actual variable overheads. Its formula is:

$$\begin{matrix}\text{Variable Overhead}\\ \text{Cost Variance}\end{matrix} = \left(\begin{matrix}\text{Std hours for}\\ \text{actual output}\end{matrix} \times \begin{matrix}\text{Std variable}\\ \text{ohds rate}\end{matrix}\right) - \begin{matrix}\text{Actual overhead}\\ \text{cost}\end{matrix}$$

VOCV = (Absorbed V.O. – Actual V.O.)

This variance is sub-divided into the following two variances:

(*a*) **Variable Overheads Expenditure Variance:** This is also known as Spending Variance or Budget Variance. This variance arises due to the difference between standard variable overheads allowed and actual variable overheads incurred. Its formula is:

$$\text{V.O. Expenditure Variance} = \left(\begin{matrix}\text{Std variable}\\ \text{overhead rate}\end{matrix} \times \begin{matrix}\text{Actual}\\ \text{hours}\end{matrix}\right) - \begin{matrix}\text{Actual overhead}\\ \text{cost}\end{matrix}$$

= (Standard V.O. – Actual V.O.)

(*b*) **Variable Overhead Efficiency Variance:** This variance arises due to the difference between standard hours allowed for actual output and actual hours. The reasons for this variance are the same which give rise to labour efficiency variance. Its formula is as follows:

$$\text{V.O. Cost Variance} = \left(\begin{matrix}\text{Std variable}\\ \text{overhead rate}\end{matrix} \times \begin{matrix}\text{Actual}\\ \text{hours}\end{matrix}\right) - \begin{matrix}\text{Std variable}\\ \text{overhead rate}\end{matrix}$$

= (Absorbed V.O. – Standard V.O.)

Check:

$$\text{V.O. Cost Variance} = \begin{matrix}\text{V.O. Expenditure}\\ \text{Variance}\end{matrix} + \begin{matrix}\text{V.O. Efficiency}\\ \text{Variance}\end{matrix}$$

Illustration 4.5: Calculate variable overheads variances from the following:

	Budgeted	*Actual*
Output (units)	20,000	19,000
Hours	5,000	4,500
Overheads – Fixed	₹10,000	10,500
Variable	₹ 5,000	4,800

Solution:

Basic calculations:

NOTES

(*a*) $\text{Std variable overhead rate} = \dfrac{\text{Budgeted overheads}}{\text{Budgeted hours}} = \dfrac{₹5{,}000}{5{,}000 \text{ hours}} = ₹1 \text{ per hour}$

(*b*) Std hours for actual output =

$$\frac{\text{Budgeted hours}}{\text{Budgeted output}} \times \text{Actual output} = \frac{5{,}000}{20{,}000} \times 19{,}000$$

= **4,750 hours**

Absorbed fixed overheads = Std hrs for actual output × Std rate

= 4,750 × 1 = ₹4,750

Standard fixed overheads = Actual hrs × Std rate = 4,500 × 1 = 4,500

Calculation of Variances:

(*a*) **Variable Overhead Cost Variance**

= Absorbed ohds – Actual variable ohds

= 4,750 – 4,800 = **₹50 (A)**

(*b*) **Expenditure Variance**

= Std overheads – Actual variable overheads

= 4,500 – 4,800 = **₹300 (A)**

(*c*) **Efficiency Variance** = Absorbed overheads – Std overheads

= 4,750 – 4,500 = **₹250 (F)**

Check:

V.O. Cost Variance = Expenditure Variance + Efficiency Variane

50 (A) = 300 (A) + 250 (F).

Fixed Overheads (F.O.) Variances

Fixed Overhead Cost Variance: It is the difference between standard fixed overhead cost for actual output (or absorbed overheads) and actual fixed overheads. Its formula is:

$$\text{F.O. Cost Variance} = \left(\begin{matrix}\text{Std hours for}\\ \text{actual output}\end{matrix} \times \begin{matrix}\text{Std F.O.}\\ \text{rate}\end{matrix}\right) - \begin{matrix}\text{Actual}\\ \text{fixed overheads}\end{matrix}$$

$$= \text{Absorbed overheads} - \text{Actual overheads}$$

Fixed overhead cost variance is sub-divided into the following two variances:

(*a*) **Fixed Overhead Expenditure Variance:** This is also known as Spending Variance or Budget Variance. It arises due to the difference between budgeted fixed overheads and actual fixed overheads. Its formula is:

$$\text{F.O. Expenditure Variance} = \left(\text{Budgeted fixed overheads} - \text{Actual fixed overheads}\right)$$

NOTES

(*b*) **Fixed Overheads Volume Variance:** This variance arises due to the difference between standard output and actual output. It is defined as that portion of overheads variance which arises due to the difference between standard cost of overheads absorbed by actual production and the standard allowance for that output.

$$\text{F.O. Volume Variance} = \left(\text{Std hours for actual output} - \text{Budgeted hours}\right) \times \text{Std rate}$$

$$= \text{Absorbed Overheads} - \text{Budgeted Overheads}$$

Example:

Calculate fixed overheads variances for the data given in Illustration 4.5.

Solution:

Basic calculations:

(*a*) $\text{Std fixed overhead rate} = \dfrac{\text{Budgeted fixed overheads}}{\text{Budgeted hours}} = \dfrac{₹10{,}000}{5{,}000 \text{ hrs}} = ₹2$

(*b*) $\text{Std hours for actual output} = \dfrac{\text{Budgeted hrs}}{\text{Budgeted output}} \times \text{Actual output}$

$= \dfrac{5{,}000}{20{,}000} \times 19{,}000 = 4.750 \text{ hrs}$

(*c*) Absorbed fixed overheads= Std hrs for actual output × Std rate

= 4,750 hrs × ₹2 = ₹9,500

Calculation of Variances:

(*a*) **Fixed Overhead Cost Variance**

= Absorbed fixed overheads – Actual fixed overheads

= 9,500 – 10,500 = **₹1,000 (A)**

(*b*) **Fixed Overhead Expenditure Variance**

= Budged overheads – Actual overheads

= 10,000 – 10,500 = **₹500 (A)**

(*c*) **Fixed Overheads Volume Variance**

= Absorbed fixed ohds – Budgeted overheads

= 9,500 – 10,000 = **₹500 (A)**

Check:

F.O. Cost Variance = Expenditure Variance + Volume Variance

1,000 (A) = 500 (A) + ₹500 (A)

NOTES

Sub-division of Overheads Volume Variance

Volume variance is further sub-divided into the following variances:

1. Efficiency Variance
2. Capacity Variance
3. Calendar Variance

1. ***Fixed Overheads Efficiency Variance:*** This is defined as '*that portion of volume variance which reflects the increased or reduced output arising from efficiency above or below the standard which is expected*.' This variance thus shows that the actual quantity produced is different from standard quantity because of higher or lower efficiency of workers engaged in production. Its formula is:

$$\text{Efficiency Variance} = \text{Absorbed fixed overheads} - \text{Standard fixed overheads}$$
$$= \left(\text{Std hrs for actual output} - \text{Actual hours}\right) \times \text{Std rate}$$

2. ***Fixed Overheads Capacity Variance:*** This is '*that portion of the volume variance which is due to working at higher or lower capacity usage than the standard*.' Thus this variance arises when plant capacity actually utilized is more or less than the capacity planned to be utilized due to factors like idle time, under or over customer demand, strikes, power failure, etc. Its formula is:

$$\text{Capacity Variance} = \left(\text{Standard fixed overheads} - \text{Budgeted overheads}\right)$$

Or

$$= \left(\text{Actual hrs worked} - \text{Budgeted hours}\right) \times \text{Std rate}$$

3. ***Calendar Variance:*** It may be defined as '*that portion of the volume variance which is due to the difference between the number of working days in the budget period and the number of actual working days in the period to which the budget is applied*'. Calendar variance is actually volume variance arising due to a particular cause, i.e., actual number of working days being different from those budgeted, due to extra holiday being declared on the death of a national leader or any other reason. Calendar variance arises only in exceptional cirmustances because normal holidays are taken into account while laying down the standards.

When calendar variance is calculated, the calculation of capacity variance has to be modified so as to induct this additional variance into the analysis. Calendar variance is calculated by the following formula:

$$\text{Calendar Variance} = \left(\text{Actual no. of working days} - \text{Std no. of working days}\right) \times \text{Std rate per day}$$

Or

$$= \left(\text{Revised budgeted hours} - \text{Budgeted hours}\right) \times \text{Std rate per hour}$$

NOTES

Generally, this variance is adverse because of extra holidays, but if there are extra working days (because of less holidays), then this variance will be favourable.

Illustration 4.6: *XYZ* Ltd has furnished you the following information for the month of August:

	Budget	Actual
Output (units)	30,000	32,500
Hours	30,000	33,000
Fixed overheads	₹ 45,000	50,000
Variable overheads	₹ 60,000	68,000
Working days	25	26

Calculate overheads variances.

Solution:

Basic calculations:

Standard hours per unit $= \frac{\text{Budgeted hours}}{\text{Budgeted units}} = \frac{30,000}{30,000} = 1$ hour

Std hrs for actual output = 32,500 units × 1 hr = 32,500

Standard overhead rate per hour $= \frac{\text{Budgeted overheads}}{\text{Budgeted hours}}$

For fixed overheads $= \frac{45,000}{30,000} =$ ₹1.50 per hour

For variable overheads $= \frac{60,000}{30,000} =$ ₹2.00 per hour

Std F.O. rate per day = ₹45,000 ÷ 25 days = ₹1,800

Recovered overheads = Std hrs for actual output × Std rate

For fixed overheads = 32,500 hrs × ₹1.50 = ₹48,750

For variable overheads = 32,500 hrs × ₹2 = ₹65,000

Standard overheads = Actual hours × Std rate

For fixed overheads = 33,000 × 1.50 = ₹49,500

For variable overheads = 33,000 × 2 = ₹66,000

Revised budgeted hours $= \frac{\text{Budgeted hours}}{\text{Budgeted days}} \times$ Actual days

$= \frac{30,000}{25} \times 26 = 31,200$ hours

Revised budgeted overheads (For fixed overheads)

= 31,200 × 1.50 = ₹46,800

NOTES

Calculation of variances:

Fixed Overheads Variances:

(*i*) F.O. Cost Variance = Recovered Overheads – Actual Overheads

= 48,750 – 50,000 = **₹1,250 (A)**

(*ii*) F.O. Expenditure Variance = Budgeted Overheads – Actual Overheads

= 45,000 – 50,000 = **₹5,000 (A)**

(*iii*) F.O. Volume Variance = Recovered Overheads – Budgeted Overheads

= 48,750 – 45,000 = **₹3,750 (F)**

(*iv*) F.O. Efficiency Variance = Recovered Overheads – Standard Overheads

= 48,750 – 49,500 = **₹750 (A)**

(*v*) F.O. Capacity Variance = Standards Overheads – Revised Budgeted Overheads

= 49,500 – 46,800 = **₹2,700 (F)**

(*vi*) Calendar Variance $= \left(\begin{matrix}\text{Actual} \\ \text{days}\end{matrix} - \begin{matrix}\text{Budgeted} \\ \text{days}\end{matrix}\right) \times \text{Std rate per day}$

= (26 – 25) × 1,800 = **₹1,800 (F)**

Variable Overheads Variances

(*i*) V.O. Cost Variance = Recovered Overheads – Actual Overheads

= 65,000 – 68,000 = **₹3,000 (A)**

(*ii*) V.O. Expenditure Variance = Std Overheads – Actual Overheads

= 66,000 – 68,000 = **₹2,000 (A)**

(*iii*) V.O. Efficiency Variance = Recovered Overheads – Std overheads

= 65,000 – 66,000 = **₹1,000 (A)**

Check

(*i*) F.O. Cost Variance =

$\begin{matrix}\text{Expenditure} \\ \text{Variance}\end{matrix} + \begin{matrix}\text{Efficiency} \\ \text{Variance}\end{matrix} + \begin{matrix}\text{Capacity} \\ \text{Variance}\end{matrix} + \begin{matrix}\text{Calendar} \\ \text{Variance}\end{matrix}$

1,250 (A) = 5,000 (A) + 750 (A) + 2,700 (F) + 1,800 (F)

(*ii*) F.O. Volume Variance $= \begin{matrix}\text{Efficiency} \\ \text{Variance}\end{matrix} + \begin{matrix}\text{Capacity} \\ \text{Variance}\end{matrix} + \begin{matrix}\text{Calendar} \\ \text{Variance}\end{matrix}$

3,750 (F) = 750 (A) + 2,700 (F) + 1,800 (F)

(*iii*) V.O. Cost Variance $= \begin{matrix}\text{Expenditure} \\ \text{Variance}\end{matrix} + \begin{matrix}\text{Efficiency} \\ \text{Variance}\end{matrix}$

3,000 (A) = 2,000 (A) + 1,000 (A)

Revised Capacity Variance

When calendar variance is to be calculated, the method of calculating capacity variance has to be modified. The new formula in that case is a follows.

NOTES

$$\text{Revised Capacity Variance} = \begin{pmatrix}\text{Actual} \\ \text{hours}\end{pmatrix} - \begin{pmatrix}\text{Revised} \\ \text{budgeted hours}\end{pmatrix} \times \text{Std rate per hr}$$

Reporting of Variances

In order that a standard costing system may be of maximum value to management, it is essential that reports exhibiting variances from standards for each element of cost of each department and operation should be quickly and effectively presented to management. Furthermore, it is essential that management should act speedily to investigate variances and, where possible, make decisions to prevent recurrence of adverse variances.

Disposition of Variances

When standard costs are not entered in the books of accounts and are used only as a statistical information, no adjustments are required at the end of the period for the variances. However, when standard costs are incorporated into the accounting system through journals and ledgers, there arises a question of adjustment and disposition of variances at the end of the accounting period.

There is no uniformity of opinion as to the proper disposition of variances. Therefore, no hard and fast rules can be laid down in this regard.

4.3.4 Sales Variance

Like manufacturing activities standards can also be used for non-manufacturing activities like storing, marketing, selling and distribution etc. to measure the performance in these areas of business. Among these, the analysis of sales variance is considered most essential as it has direct bearing on profitability and stability of concern.

Sales variances are used to measure the sales performance of an organization. The analysis of sales variance can be done under two broad categories viz.,

- value variances; and
- margin variances.

Sales Value Variance: A sales value variance represents the difference between actual sales and budgeted sales. The major reasons for such a variance are price, quantity mix or sales mix. Accordingly, sales value variance can be divided into two sub-variances, viz., sales price variance and sales volume variance. The sales value variance is computed as follows:

Sales value variance (SVV) = (Budgeted value of sales – Actual value of sales)

or SVV = (BU × BP) – (AU – AP)

where

BU = budgeted/standard sales units

BP = budgeted/standard price

AU = actual sales units

AP = actual price

Sales Price Variance: Sales price variance reveals the diff erence between standard selling price and actual selling price. Such a variance measures the eff ect on total profi t due to the change in unit selling prices. It is calculated as:

Sales price variance (SPV) = (Standard price – Actual price) × Actual sales units

SPV = (SP – AP) × AU

The variance is favourable if the standard price is less than actual price.

Sales Volume Variance: Sales volume variance measures that part of the sales value variance which is due to selling more or fewer units of product than the standard units of product. This variance is computed by multiplying the diff erence between the actual number of units sold and the budgeted number of units sold by standard price per unit. Thus,

Sales value variance (SVV) = (Standard unit of sales – Actual units of sales) × Standard price per unit

or SVV = (SU – AU) × SP

The excess of actual sales units over standard sales units would reveal favourable variance and vice versa. The sales variance is further divided into the following two sub-variances:

Sales Mix Variance: Sales mix variance is that part of the sales volume variance which is caused by the changes in the sales mix of multiple outputs. It represents the diff erence between proportions of budgeted sales mix and actual sales mix. The variance is calculated as follows:

Sales mix variance (SMV) = (Revised standard mix* – Actual mix) × Standard price

or SMV = (RSM* – AM) × SP

* The standard mix is revised to form revised standard mix because standard mix already formed has to be revised in proportion to actual mix of sales.

The revised standard mix for each item of sales is calculated with the help of the following formula:

$$\text{Revised standard} = \frac{\text{Budgeted units of the item}}{\text{Total budgeted sales units}} \times \text{Total actual sales units}$$

The variance will be favourable, if the revised standard mix is less than actual mix and vice versa.

NOTES

Sales Quantity Variance: Sales quantity variance refl ects the remaining portion of sales volume variance. This variance is computed by multiplying the diff erence between the revised standard sales units and the standard sales units by the standard price. Thus,

Sales quantity variance (SQV) =

(Revised standard mix – Standard mix) × Standard price per unit

SQV = (RSM – SM) × SP

If the revised standard mix is more than the standard mix, the variance is favourable and vice versa.

Illustration 4.7 The sales data for a period in respect of two products are given below:

Product	*Budgeted*			*Actual*		
	Qty (₹)	*Price* (₹)	*Value* (₹)	*Qty* (₹)	*Price* (₹)	*Value* (₹)
PEE	3,000	2	6,000	2,000	3	6,000
TEE	2,000	3	6,000	4,000	1	8,000
	5,000		12,000	6,000		14,000

You are required to compute sales variances.

Solution

Sales value variance	= (BU × BP) – (AU × AP)			
Product PEE	= (3,000 × 2) – (2,000 × 3)	=	0	
Product TEE	= (2,000 × 3) – (4,000 × 2)	=	2,000	(F)
Total (SVV)	=		₹ 2,000	(F)
Sales price variance	= (SP – AP) × AU			
Product PEE	= (2 – 3) × 2,000	=	2,000	(F)
Product TEE	= (3 – 2) × 4,000	=	4,000	(UF)
Total (SPV)	=		₹ 2,000	(UF)
Sales volume variance	= (SU – AU) × SP			
Product PEE	= (3,000 – 2,000) × 2	=	2,000	(UF)
Product TEE	= (2,000 – 4,000) × 3	=	6,000	(F)
Total (SVOV)	=		₹ 4,000	(F)

Verification

Sales value variance = Sales price variance + Sales volume variance

₹ 2,000 (F) = ₹ 2,000 (UF) + 4,000 (F)

Sales mix variance	= (RSM – AM) × SP			
Product PEE	= (3,600[1] – 2,000) × 2	=	3,200	(UF)
Product TEE	= (2,400[1] – 4,000) × 3	=	4,800	(F)
Total (SMV)		=	₹ 1,600	(F)
Sales quality variance	= (RSM – SM) × SP			
Product PEE	= (3,600 – 3,000) × 2	=	1,200	(F)
Product TEE	= (2,400 – 2,000) × 3	=	1,200	(F)
Total (SQV)		=	₹ 2,400	(F)

Verification

Sales volume variance = Sales mix variance + Sales quantity variance

₹ 4,000 (F) = ₹ 1,600 (F) + ₹ 2,400 (F)

NOTES

Working

$$\text{RSW} = \frac{\text{Budgeted units of the sales item}}{\text{Total budgeted sales units}} \times \text{Total actual sales units}$$

$$\text{Product PEE} = \frac{3,000}{5,000} \times 6,000 = 3,600 \text{ units}$$

$$\text{Product TEE} = \frac{2,000}{5,000} \times 6,000 = 2,400 \text{ units}$$

Sales Margin Variance: Sales margin variance attempts to reflect the impact of a change in sales on profits. It is a measure of the amount of variance that arises due to the difference between standard margin and the actual margin from the quantity of the goods sold. This variance is computed as:

Sales margin variance (SMAV) = (Budgeted profit – Actual Profit)

SMAV = (BU × BPF) – (AU × APF)

where

BU = Budgeted units of sale

BPF = Budgeted profit per unit

AU = Actual units sold

APF = Actual profit per unit

If the budgeted profit is less than the actual profit the variance is favourable and vice versa. Like sales value variance the sales margin variance consists of the following two sub-variance:

(i) **Sales Margin Price Variance:** The sales margin price variance is a measure of variance caused solely by the difference between standard selling price and actual selling price. This variance is calculated with following formula:

Sales margin price variance (SMAPV) = (Sales price – Actual price) X Actual units

SMAPV = (SP – AP) X AU

If the actual price is greater than the standard price the variance is favourable and vice versa.

(ii) **Sales Margin Volume Variance**: Like sales value variance this variance measures the difference between budgeted units annd actual units of sales. This variance is calculated as follows:

Sales margin volume variance (SMAVV) = (Standard units of sales – Actual units of sales)X (Standard profit per unit)

The excess of actual units over budgeted units would reveal favourable variance and vice versa. The two components of this sub-variance are sales margin mix variance and sales margin quantity variance which are as follows:

I. Sales margin mix variance (SMAV) = (Revised standard mix – Actual mix) X Standard profit per unit SMAV = (RSM – AM) X SPF

If the revised standard mix is less than the actual mix, the variance is favourable and vice versa.

Sales margin quantity variance = (Revised standard mix – Standard mix)X Standard Profit per unit

SMAQV = (RSM – SM) × SPF

If the revised standard mix is more than the standard mix, the variance is favourable and vice versa.

Check Your Progress

3. State the important feature of yield variance which differentiates it from other material variances.
4. Why is labour rate variance often uncontrollable?
5. Mention some reasons for abnormal idle time which results in labour efficiency variance.
6. Which overhead variance is also known as budget or spending variance?
7. What is calendar variance?

4.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Unfavourable variance is also known as adverse or debit variance.
2. The principle which is used in case of management's approach to controllable and uncontrollable variance is the principle of exception whereby those matters which are going right are ignored and any deviations from efficient performance are investigated.
3. One important feature of yield variance which differentiates it from other material variances (price, usage and mix) is that yield variance is an output variance, while others are input variances.
4. Often, labour rate variance will be an uncontrollable variance as labour rates are usually determined by demand and supply conditions in the labour market, backed by negotiable strength of the trade union.
5. Some examples of events which cause abnormal idle time and results in labour efficiency variance include time lost due to machine break-down, power failure, strike, etc.

6. Fixed overhead expenditure variance is also known as spending variance or budget variance.
7. Calendar variance may be defined as that portion of the volume variance which is due to the difference between the number of working days in the budget period and the number of actual working days in the period to which the budget is applied.

4.5 SUMMARY

- The difference between the standard costs and actual costs is known as 'variance'.
- Variance analysis is the process of analysing variances by sub-dividing the total variance in such a way that management can identify reasons for off standard performance and persons can be held responsible for their occurrence so that corrective action can be taken.
- Cost variance is the difference between a standard cost and the comparable actual cost incurred during a period. These variances can be favourable or unfavourable and controllable and uncontrollable variances.
- Variances are analysed for each element of cost, i.e., material cost variance, labour cost variance and overhead cost variance. Each of these variances are then further analysed according to causes.
- Material cost variance is divided into material price variance and material quantity variance and then material quantity variance is further analysed into material mix variance and material yield variance.
- Labour cost variance and overhead cost variance are also further analysed in detail as is done in the case of material variances. In this way, by computing these variances, the detailed reasons for cost variance come to light.
- These variances are fully investigated and reported to the appropriate level of management for taking remedial steps so that actual costs adhere to predetermined standard costs.

4.6 KEY WORDS

- **Direct material cost variance:** It is the difference between the standard cost of direct materials specified for the output achieved and the actual cost of direct materials used.
- **Direct labour cost variance:** It is the difference between the standard direct labour cost specified for the activity achieved and the actual labour cost incurred.

- **Overhead cost variance:** It refers to the total overheads variance and can be described as the difference between total standard overheads absorbed and total actual overheads incurred.

NOTES

4.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. What are favourable and unfavourable variances?
2. Write a short note on controllable and uncontrollable variances.
3. What is methods variance?
4. Mention the formula of revision variance.

Long Answer Questions

1. What is the significance of the term variance? Define and explain what do you understand by the following:
   (a) Material Variances
   (b) Labour Variances
   (c) Overheads Variances
2. Following are the particulars in respect of a product where two types of materials *A* and *B* are used:

Material	Standard		Actual	
input	*Tonnes*	*Rate* ₹	*Tonnes*	*Rate* ₹
A	120	10.00	140	9.50
B	80	7.50	60	9.00
	200		200	
Less: Loss	20		18	
Net production	180		182	

   You are required to calculate:
   (*a*) Material Price Variance
   (*b*) Material Mix Variance
   (*c*) Material Yield Variance
   (*d*) Material Usage Variance
3. Find out different Labour Variances.

	Standard	*Actual*
Output:	1,000 units	1,200 units
Rate of payment:	₹ 6 per unit	Wages paid with bonus : ₹ 8,000
Time taken:	50 hours	40 hours

NOTES

4. From the following prepare variance analysis of a particular department for a month:

Variable Overheads items:	*Actual* ₹
Material handing	8,325
Idle Time	850
Rework	825
Overtime premium	250
Supplies	4,000
	14,250
Fixed Overheads Items:	
Supervision	1,700
Depreciation of plant	2,000
Depreciation of equipment	5,000
Rates	1,150
Insurance	350
	10,200

Normal capacity 10,000 standard hours, budgeted rate ₹ 1.70 per standard hour for variable overheads and ₹ 1 per standard hour for fixed overheads. Actual level is 8,000 standard hours.

4.8 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

NOTES

BLOCK - II
MARGINAL COSTING, FINANCIAL STATEMENT AND RATIO ANALYSIS

UNIT 5 MARGINAL COSTING

Structure

5.0 INTRODUCTION

Decision making is the dominant activity undertaken by managers. This activity has a bearing on the company's operations and the resultant profit/loss. Under cost behaviour, you learnt that the costs may be variable or fixed. Where fixed costs due to its nature cannot be easily changed in short term nor generally is, variable costs arise due to the manager's decision to produce additional outputs or services. Marginal costing helps with the analysis of such costs. It takes into account the variable costs unlike the traditional method of costing, which is absorption costing. In this unit, you will be introduced to the concept of absorption (full) and marginal (variable) costing.

5.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the concept of meaning of marginal costing
- Discuss the difference in income determination in marginal and absorption costing
- Describe the features of marginal costing
- Examine the advantages and limitations of marginal costing

5.2 MARGINAL AND ABSORPTION COSTING

NOTES

There are mainly two techniques of product costing and income determination — (a) Absorption costing; (b) Marginal costing.

Absorption Costing

This is a total cost technique under which total cost (i.e., fixed cost as well as variable cost) is charged as production cost. In other words, in absorption costing, all manufacturing costs are absorbed in the cost of the products produced. In this system, fixed factory overheads are absorbed on the basis of a predetermined overhead rates, based on normal capacity. Under/over absorbed overheads are adjusted before computing profit for a particular period. Closing stock is also valued at total cost which includes all direct costs and fixed factory overheads (and sometimes administration overheads also).

Absorption costing is a traditional approach and is also known as Conventional Costing or Full Costing.

Marginal Costing

An alternative to absorption costing is marginal costing, also known as 'variable costing' or direct costing. Under this technique, only variable costs are charged as product costs and included in inventory valuation. Fixed manufacturing costs are not allotted to products but are considered as period costs and thus charged directly to Profit and Loss Account of that year. Fixed costs also do not enter in stock valuation.

Both absorption costing and marginal costing treat non-manufacturing costs (i.e., administration, selling and distribution overheads) as period costs. In other words, these are not inventoriable costs.

Product Costs and Period Costs

Product costs are those costs which become a part of production cost. Such costs are also included in inventory valuation. Period costs, on the other hand, are those costs which are not associated with production. Such costs are treated as an expense of the period in which these are incurred. These do not form part of the cost of products or inventory. These are directly transferred to Profit and Loss Account of the period.

5.2.1 Concept of Marginal Cost

Marginal cost is the additional cost of producing an additional unit of product. It is the total of all variable costs. It is composed of all direct costs and variable overheads. The CIMA London has defined marginal cost 'as the amount at any given volume of output by which aggregate costs are changed, if volume of output

is increased or decreased by one unit'. It is the cost of one unit of product which would be avoided if that unit were not produced. An important point is that marginal cost per unit remains unchanged, irrespective of the level of activity.

NOTES

Illustration 5.1: A company manufactures 100 units of a product per month. Total fixed cost per month is ₹ 5,000 and marginal cost per unit is ₹ 250. The total cost per month will be:

		₹
Marginal (variable) cost of 100 units		25,000
Fixed cost		5,000
	Total cost	30,000

If output is increased by one unit, the cost will appear as follows:

Marginal cost (101 × 250)		25,250
Fixed cost		5,000
	Total cost	30,250

Thus the additional cost of producing one additional unit is ₹ 250, which is its marginal cost. However, where fixed costs may also increase with the increase in the volume of output, but this may be the result of increase in production capacity. Such increases in fixed costs are dealt with as a part of what is known as 'differential cost analysis'.

Illustration 5.2. Ambitious Enterprises is currently working at 50 per cent capacity and produces 10,000 units.

At 60 per cent working, raw material cost increases by 2 per cent and selling price falls by 2 per cent. At 80 per cent working, raw material cost increases by 5 per cent and selling price falls by 5 per cent. At 50 per cent capacity working, the product costs ₹180 per unit and is sold at ₹200 per unit. The unit cost of ₹180 is made up as follows:

	₹	
Material	100	
Wages	30	
Factory Overheads	30	(40% Fixed)
Administration Overheads	20	(50% Fixed)

Prepare a marginal cost statement showing the estimated profit of the business when it is operated at 60 per cent and 80 per cent capacity.

Solution:

NOTES

Marginal Cost Statement

Particulars		60% Capacity Output 12,000 units Total ₹	Per unit ₹	80% Capacity Output 16,000 units Total ₹	Per unit ₹
Materials		12,24,000	102	16,80,000	105
Wages		3,60,000	30	4,80,000	30
Variable Factory Overheads		2,16,000	18	2,88,000	18
Variable Administration Overheads		1,20,000	10	1,60,000	10
Total Marginal Cost	(*i*)	19,20,000	160	26,08,000	163
Sales	(*ii*)	23,52,000	196	30,40,000	190
Contribution	(*iii*)	4,32,000	36	4,32,000	27
Fixed Factory Overheads		1,20,000	10	1,20,000	7.50
Fixed Administration Overheads		1,00,000	8.23	1,00,000	6.25
Fixed Costs	(*iv*)	2,20,000	18.23	2,20,000	13.75
Net Profit [(*iii*) – (*iv*)]		2,12,000	17.77	2,12,000	13.25

Working Notes:

		₹
(*i*)	Material cost per unit at 50% capacity	100
	Add: 2% at 60% capacity	2
	Material cost per unit at 60% capacity	102
(*ii*)	Material cost at 50% capacity	100
	Add: 5% at 80% capacity	5
	Material cost per unit at 80% capacity	105
(*iii*)	Selling price per unit at 50% capacity	200
	Less: 2% at 60% capacity	4
	Selling price at 60% capacity	196
(*iv*)	Selling price per unit at 50% capacity	200
	Less: 5% at 80% capacity	10
	Selling price at 80%	190
(*v*)	Variable factory overheads:	
	Factory overheads per unit at 50% capacity	30
	Less: Fixed factory overheads	12
	Variable factory overheads per unit	18
	Total fixed factory overheads (₹12 × 10,000)	1,20,000
(*vi*)	Variable administration overheads:	
	Administration overheads per unit	20
	Less: Fixed administration overheads per unit	10
	Variable administration overheads per unit	10
	Total fixed administration overheads (₹10 × 10,000)	1,00,000

NOTES

5.2.2 Difference in Income Determination

The points of distinction between marginal costing and absorption costing are summarized as follows:

1. **Treatment of fixed and variable costs:** In marginal costing, only variable costs are charged to products. Fixed costs are treated as period costs and charged to Profit and Loss Account of the period.

   In absorption costing, all costs (both fixed and variable) are charged to the product. The fixed factory overhead cost is absorption in units produced at a rate predetermined on the basis of normal capacity utilization (and not on the basis of actual production).

2. **Valuation of stock:** In marginal costing, stock of work-in-progress and finished goods are valued at marginal cost only.

   In absorption costing, stocks are valued at total cost which includes both fixed and variable costs. Thus stock values in marginal costing are lower than that in absorption costing.

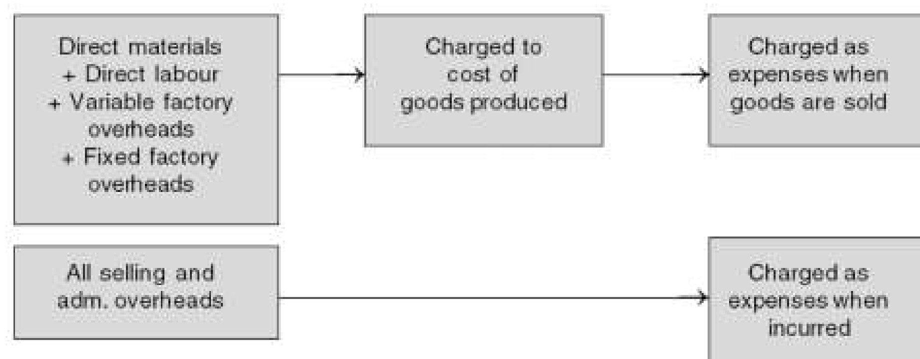


Fig. 5.1 *Absorption Costing Approach*

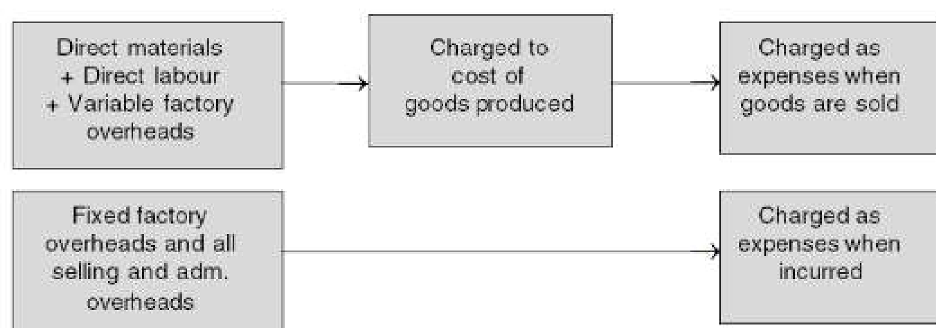


Fig. 5.2 *Marginal Costing Approach*

3. **Measurement of profitability:** In marginal costing, relative profitability of pro-ducts or departments is based on a study of relative contribution made by respective products or departments. The managerial decisions are thus guided by contribution.

In absorption costing, relative profitability is judged by profit figures which is also a guiding factor for managerial decisions.

NOTES

Income Determination under Marginal Costing and Absorption Costing

The net profit under the two systems may be same or may be different. Difference in profit may be because of the different basis of inventory valuation. In marginal costing stocks of work-in-progress and finished goods are valued at variable cost whereas in absorption costing stocks are valued at total cost.

Income statement under the two systems may be prepared in the formats given below:

Format of Income Statement (Absorption costing)

		₹
Sales		×××××
Production Costs:		
Direct material consumed		×××××
Direct labour cost		×××××
Variable manufacturing overheads		×××××
Fixed manufacturing overheads		×××××
Cost of goods produced		×××××
Add: Opening stock of finished goods (valued at cost of previous period's production)		×××××
Cost of goods available for sale		×××××
Less: Closing stock of finished goods (valued at production cost of current period)		×××××
Cost of goods sold		×××××
Add: (or less) Under (or over) absorption of fixed manufacturing overheads		×××××
Add: Administration costs	×××××	
Selling and distribution costs	×××××	×××××
Total Cost		×××××
Profit (Sales – Total cost)		×××××

Illustration 5.3

Zen Ltd supplies you the following data:

Direct material cost		₹ 48,000
Direct wages		₹ 22,000
Variable overheads	—Factory	₹ 13,000
	—Adm. and selling	₹ 2,000
Fixed overheads	—Factory	₹ 20,00
	—Adm. and selling	₹ 8,000
Sales		₹ 1,25,000

Prepare an income statement under absorption costing.

NOTES

Solution:

Income Statement (Absorption Costing)

		₹
(A) Sales		1,25,000
Direct materials		48,000
Direct wages		22,000
Factory overheads—Variable	13,000	
—Fixed	20,000	33,000
Cost of Production		1,03,000
Adm. and selling overheads		
—Variable	2,000	
—Fixed	8,000	10,000
(B) Total Cost		1,13,000
Profit (A – B)		12,000

Format of Income Statement (Marginal Costing)

	₹
Sales	×××××
Variable manufacturing costs	
—Direct material consumed	×××××
—Direct labour	×××××
—Variable manufacturing overheads	×××××
Cost of goods produced	×××××
Add: Opening stock of finished goods	×××××
(valued at variable cost of previous period)	
Less: Closing stock of finished goods (valued at current variable cost)	
Cost of goods sold	×××××
Add: Variable adm., selling and dist. overheads	×××××
Total Variable Cost	×××××
Contribution (Sales – Total variable cost)	×××××
Less: Fixed costs (Production, adm., selling and dist.)	×××××
Net Profit	×××××

Difference in Profit under Marginal Costing and Absorption Costing

Profit under the two systems may be different because of difference in the stock valuation. Position in this regard is summarized as follows:

(a) Production is equal to sales

(i) When there are no opening and closing stock, profit/loss under absorption and marginal costing systems are equal.

(ii) When opening stock is equal to closing stocks then also profit/loss under the two systems will be equal provided the fixed cost element in opening and closing stocks is the same amount.

(b) Production is more than sales

When production during a period is more than sales, i.e., when closing stock is more than opening stock, the profit as per absorption costing will be more than that shown by marginal costing. This is because in absorption costing a part of fixed overheads included in closing stock value is carried forward to next accounting period in the form of closing stock.

(c) Production is less than sales

When production during a period is less than sales, i.e., when opening stock is more than closing stock, profit shown by marginal costing will be more than that shown by absorption costing. This is because under absorption costing, cost of goods sold is higher because a part of fixed cost from the preceding period is added to the current year's cost of goods sold in the form of opening stock.

To summarize the effect on profit under marginal costing and absorption costing:

Effect of	*Profit in marginal costing*	*Profit in absorption costing*
1. Production = Sales	13,000	Equal
2. Production > Sales	Lower	Higher
3. Production < sales	Higher	Lower

Illustration 5.4

XYZ Ltd supplies you the following data, for the year ending 31 December 2017.

Production—1,100 units, Sales 1,000 units

There was no opening stock.

	₹
Variable manufacturing cost per unit	7
Fixed manufacturing overheads (total)	2,200
Variable selling and administration overheads per unit	0.50
Fixed selling and administration overheads (total)	400
Selling price per unit	15

NOTES

Prepare

(a) Income statement under marginal costing
(b) Income statement under absorption costing
(c) Explain the difference in profit under marginal and absorption costing, if any

Solution:

Income Statement (Absorption Costing)

for the year ended 31 December 2017

		₹
Sales (1,000 units @ ₹15)		15,000
Variable manufacturing overheads (1,100 units @ ₹7)		7,700
Fixed manufacturing overheads (1,100 units @ ₹2)		2,200
Cost of goods produced		9,900
Less: Closing stocks (100 units @ ₹9)*		900
Cost of goods sold		9,000
Add: Selling and adm. overheads		
—Variable (1,000 units × ₹0.50)	500	
—Fixed	400	900
Total cost		9,900
Profit (Sales – Total Cost)		5,100

*Closing stock is valued at manufacturing cost per unit, i.e., ₹ 7 + 2 = ₹ 9 per unit.

Income Statement (Marginal Costing)

for the year ending 31 December 2017

		₹
Sales (1,000 units @ ₹15)		15,000
Variable manufacturing cost (1,100 units @ ₹7)		7,700
Less: Closing Stock (100 units @ ₹7)		700
Cost of goods produced		7,000
Add: Variable selling and adm. overheads (1,000 units @ ₹0.50)		500
Total variable cost of goods sold		7,500
Contribution (Sales – Total variable cost)		7,500
Less: Fixed overheads—Manufacturing	2,200	
—Selling and adm.	400	2,600
Profit		4,900

Comments: Profit under absorption costing is ₹ 5,100 and under marginal costing ₹ 4,900. The difference of ₹ 200 in profit is due to over-valuation of closing stock in absorption costing by ₹ 200 (i.e., ₹ 900 – 700).

5.3 MEANING AND FEATURES OF MARGINAL COSTING

Marginal costing is defined by CIMA London as 'The accounting system in which variable costs are charged to cost units and fixed costs of the period are written off in full, against the aggregate contribution. Its special value is in decision making'.

Characteristics of Marginal Costing

The essential characteristics and mechanism of marginal costing technique may be summed up as follows:

NOTES

1. Segregation of costs into fixed and variable elements: In marginal costing all costs are classified into fixed and variable. Semi-variable costs are also segregated into fixed and variable elements.
2. Marginal costs as products costs: Only marginal (variable) costs are charged to products produced during the period.
3. Fixed costs as period costs: Fixed costs are treated as period costs and are charged to Costing Profit and Loss Account of the period in which they are incurred.
4. Valuation of inventory: The work-in-progress and finished stocks are valued at marginal cost only.
5. Contribution: Contribution is the difference between sales value and marginal cost of sales. The relative profitability of products or departments is based on a study of 'contribution' made by each of the products or departments.
6. Pricing: In marginal costing, prices are based on marginal cost plus contribution.
7. Marginal costing and profit: In marginal costing, profit is calculated by a two-stage approach. First of all, contribution is determined for each product or department. The contributions of various products or departments are pooled together and such a total of contributions from all products is called 'Fund'. Then from this fund is deducted the total fixed cost to arrive at a profit or loss.

5.3.1 Advantages – Limitations

The following advantages are claimed for marginal costing over total absorption costing:

1. **Help in managerial decisions:** The most important advantage of marginal costing is the assistance that it renders to management in taking many valuable decisions. Information regarding marginal cost and contributions provided by marginal costing facilitates making policy decisions in problems, like fixing selling prices below cost, make or buy, introduction of a new product line, utilization of spare plant capacity, selection of the most profitable product mix, etc. This has been discussed in detail later, in a separate unit.
2. **Cost control:** Greater control over cost is possible. This is so because by classifying costs into fixed and variable, the management can concentrate more on the control of variable costs which are generally controllable and pay less attention to fixed costs which may be controlled only by the top management and that too, to a limited extent.

NOTES

3. **Simple technique:** Marginal costing is comparatively simple to operate because it avoids the complications involved in allocation, apportionment and absorption of fixed overheads which is, in fact, arbitrary division of indivisible fixed costs.
4. **No under and over-absorption of overheads:** In marginal costing, there is no problem of under or over-absorption of overheads.
5. **Constant cost per unit:** Marginal costing takes into account only variable costs which remain the same per unit of product, irrespective of the volume of output. It therefore avoids the effect of varying cost per unit as it ignores fixed costs which are incurred on a time basis and have no relation with the size of production.
6. **Realistic valuation of stocks:** In marginal costing, stocks of work-in-progress and finished goods are valued only at variable costs. Thus no fictitious profits can arise due to fixed cost being absorbed and capitalized in unsold stock. This is because marginal costing prevents the carry forward in stock valuation of some portion of current year's fixed costs. Stock valuation in marginal costing, is, therefore more realistic and uniform.
7. **Aid to profit planning:** To aid profit planning marginal costing technique enables data to be presented to management in such a way as to show cost-volume-profit relationship. Graphic presentation in the form of break-even charts and profit-volume charts are also used to facilitate planning future performance.
8. **Valuable adjunct to other techniques:** Marginal costing is a valuable adjunct to standard costing and budgetary control.

Disadvantages: The main disadvantages of marginal costing are as follows:

1. **Difficult analysis:** Marginal costing assumes that all costs can be analysed into fixed and variable elements. In practice however, it may be difficult to segregate all costs into fixed and variable components. Certain costs are caused purely by management decisions and cannot be strictly classified as fixed or variable, *e.g.,* ameneties to staff, bonus to workers, etc.
2. **Ignores time factor:** By ignoring fixed costs, time factor is also ignored. For instance, marginal cost of two jobs may be identical but if one job takes twice as long to complete as the other, the true cost of the job taking longer time is higher than that of the other. This is not disclosed by marginal costing. Production cannot be achieved without incurring fixed costs but marginal costing creates an illusion that fixed costs have nothing to do with production.
3. **Difficulty in application:** It is difficult to apply marginal costing technique in industries where large stocks of work-in-progress are locked up. Thus in ship building or construction contracts, if fixed overheads are not included in the valuation of work-in-progress, there may be losses each year, while

on the completion of contracts, there may be huge profits. Such fluctuations in profits can be avoided if total absorption costing is employed.

4. **Less effective in capital-intensive industries:** In capital-intensive industries, the proportion of fixed costs (like depreciation, maintenance, etc.) is large. The marginal costing technique, which ignores fixed cost, thus proves less effective in such industries. With the increased automation in industries, marginal costing is, therefore, left with a limited scope.
5. **Improper basis of pricing:** Where prices are fixed by competition, marginal costing gives the impression that so long as prices exceed marginal cost, production is profitable. It ignores the danger of too much sales being made at marginal cost or marginal cost plus some contribution as it may result in overall losses. Although in certain circumstances product may be sold at less than total cost, prices in the long run must cover total cost as otherwise profit cannot be earned.

Check Your Progress

1. How are fixed manufacturing costs treated in marginal costing?
2. What is the nature of profit/loss under absorption and marginal costing in case there is no opening and closing stock?
3. What happens to semi-variable costs in marginal costing?
4. In which type of industries is marginal costing less effective?

5.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. In marginal costing, fixed manufacturing costs are not allotted to products but are considered as period costs and thus charged directly to Profit and Loss Account of that year.
2. When there are no opening and closing stock, profit/loss under absorption and marginal costing systems are equal.
3. In marginal costing, semi-variable costs are also segregated into fixed and variable elements.
4. In capital-intensive industries, the proportion of fixed costs (like depreciation, maintenance, etc.) is large, the marginal costing technique, which ignores fixed cost, thus proves less effective in such industries.

5.5 SUMMARY

- Absorption costing and marginal (variable) costing are the two main techniques of cost ascertainment and income determination.

NOTES

- Absorption costing is a traditional method under which all manufacturing costs (variable and fixed) are treated as Product Costs while non-manufacturing costs (e.g., selling and administrative expenses) are treated as Period Costs.
- Products costs become a part of production cost and period costs are not associated with production.
- Marginal or variable costing is a managerial technique under which, only variable manufacturing costs are treated as products costs and all fixed manufacturing costs and all non-manufacturing costs are treated as period costs and charged directly to Profit and Loss Account.
- The CIMA London has defined marginal cost 'as the amount at any given volume of output by which aggregate costs are changed, if volume of output is increased or decreased by one unit'. It is the cost of one unit of product which would be avoided if that unit were not produced. An important point is that marginal cost per unit remains unchanged, irrespective of the level of activity.
- The points of difference between marginal and absorption costing are on account of treatment of fixed and variable costs, valuation of stock and measurement of profitability.
- In marginal costing stocks of work-in-progress and finished goods are valued at variable cost whereas in absorption costing stocks are valued at total cost.
- Profits under the absorption and marginal costing may be different because of the difference in stock valuation.
- The essential characteristics of marginal costing include factors like segregation of costs into fixed and variable elements, taking marginal costs as product costs, consideration of fixed costs as period costs, valuation of inventory at marginal cost only, pricing based on marginal cost plus contribution and the pooling of contribution from different products and its deduction form total fixed costs to arrive at profit or loss.
- Advantages of marginal costing helps in managerial decisions, cost control, simple technique, no under and over-absorption of overheads, constant cost per unit, realistic valuation of stocks, aid to profit planning and valuable adjunct to other techniques.
- Disadvantages of marginal costing: difficult analysis, ignores time factor, difficulty in application, less effective in capital-intensive industries, and improper basis of pricing.

5.6 KEY WORDS

NOTES

- **Absorption costing:** It refers to the total cost technique under which total cost (i.e., fixed cost as well as variable cost) is charged as production cost.
- **Marginal costing:** It is the accounting system in which variable costs are charged to cost units and fixed costs of the period are written off in full, against the aggregate contribution.
- **Marginal cost:** It is the additional cost of producing an additional unit of product.

5.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. Define the concept of marginal and absorption costing.
2. Compare product and period costs.
3. What are the points of distinction between marginal and absorption costing?
4. Write a short note on difference in profit under marginal and absorption costing.
5. What are the characteristics of marginal costing?

Long Answer Questions

1. Describe income determination under marginal and absorption costing.
2. Explain the advantages and disadvantages of marginal costing over total absorption costing.
3. *XYZ* Ltd has a production capacity of 2,00,000 units per year. Normal capacity utilization is reckoned as 90%. Standard variable production costs are ₹ 11 per unit. The fixed costs are ₹ 3,60,000 per year. Variable selling costs are ₹ 3 per unit and fixed selling costs are ₹ 2,70,000 per year. The unit selling price is ₹ 20. In the year just ended on 30 June 2010, the production was 1,60,000 units and sales were 1,50,000 units. The closing inventory on 30 June was 20,000 units. The actual variable production costs for the year were ₹ 35,000 higher than the standard.
   (*i*) Calculate the profit for the year—
   (*a*) by absorption costing method; and (*b*) by marginal costing method.
   (*ii*) Explain the difference in the profits.

NOTES

4. The TDC Ltd. manufactures 1,000 articles for home consumption at the following costs:

Particulars	(₹)	(₹)
Marginal		80,000
Wages		72,000
Factory overheads:		
Fixed	24,000	
Variable	40,000	64,000
Administrative overheads (fixed)		36,000
Selling and distribution overheads:		
Fixed	20,000	
Variable	32,000	52,000
Total		3,04,000

The home market can consume only 2,000 articles at a selling price of ₹ 300 per article. However, the foreign market for this product can consume additional 4,000 articles if the price is reduced to ₹ 250.

Is the foreign market worth trying?

5. The following information in respect of product X and product Y of A Co. Limited is obtained:

Particulars	*Product X* (₹)	*Product Y* (₹)
Selling price	200	128
Material	80	80
Direct labour		
(₹ 0.50 per hour)	40 hrs.	8 hrs.
Variable overheads		
(100 per cent of direct wages)		
Fixed overheads	6,000	

Present the above information to show the profitability of products during labour shortage.

5.8 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 6 COST – VOLUME – PROFIT ANALYSIS

NOTES

Structure

6.0 INTRODUCTION

Marginal costing is a tool used in profit planning. This relationship is termed cost volume-profit analysis. It helps the management in varied ways. This includes understanding the relationship of cost and volume, the production levels at which the organization will break-even, the relationship in the variations in output levels and the resultant profit, and the relation between the sales level needed to reach a target profit and vice versa. From an accountant's point of view too, cost-volume-profit analysis is very valuable. It helps the accountant predict profits accurately, prepare flexible budgets, ascertain the charging of overheads, performance evaluation as well as setting up an appropriate price policy. In this unit, you will learn about the concept of cost volume-profit analysis, break even analysis.

6.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning of cost-volume profit analysis and break-even analysis
- Discuss the concepts of contribution and profit volume ratio
- Describe the methods of break even analysis
- Explain margin of safety and cost indifference point

6.2 OVERVIEW OF COST-VOLUME PROFIT ANALYSIS AND BREAK EVEN ANALYSIS

Cost-volume-profit analysis (CVP analysis) is an extension of the principles of marginal costing. It studies the interrelationship of three basic factors of business operations:

(a) Cost of production
(b) Volume of production/sales
(c) Profit

These three factors are interconnected in such a way that they act and react on one another because of cause and effect relationship amongst them. The cost of a product determines its selling price and the selling price determines the level of profit. The selling price also affects the volume of sales which directly affects the volume of production and volume of production in turn influences cost. In brief, variations in volume of production results in changes in cost and profit. CIMA London has defined CVP analysis as, 'the study of the effects on future profits of changes in fixed cost, variable cost, sales price, quantity and mix.'

An understanding of CVP analysis is extremely useful to management in budgeting and profit planning. It explains the impact of the following on the net profit:

(a) Changes in selling prices
(b) Changes in volume of sales
(c) Changes in variable cost
(d) Changes in fixed cost

In fact, CVP analysis helps in determining the probable effect of change in any one of these factors on the remaining factors.

Break-even Analysis

Break-even analysis is a widely-used technique to study the CVP relationship. It is interpreted in narrow as well as broad sense.

In its narrow sense, break-even analysis is concerned with determining break-even point, i.e., that level of production and sales where there is no profit and no loss. At this point total cost is equal to total sales revenue.

When used in broad sense, break-even analysis is used to determine probable profit/loss at any given level of production/sales. It is also used to determine the amount of sales to earn a desired amount of profit.

NOTES

Assumptions underlying Break-even Analysis

The break-even analysis is based on the following assumptions:

1. All costs can be separated into fixed and variable components.
2. Variable cost per unit remains constant and total variable cost varies in direct proportion to the volume of production.
3. Total fixed cost remains constant.
4. Selling price per unit does not change as volume changes.
5. There is only one product or in the case of multiple products, the sales mix does not change. In other words, when several products are being sold, the sale of various products will always be in some predetermined proportion.
6. There is synchronization between production and sales. In other words, volume of production equals volume of sales.
7. Productivity per worker does not change.
8. There will be no change in the general price level.

Before, you learn about the calculations involved in break-even analysis. Let's learn some of the important terms.

6.2.1 Contribution and Profit Volume Ratio

Contribution is the difference between sales and the marginal (variable) cost of sales. It is also known as contribution margin (Cm) or gross margin. Thus contribution is calculated by the following formula:

Contribution = Sales – Variable cost $(C = S - V)$

Also, Contribution = Fixed cost + Profit $(C = F + P)$

or Contribution = Fixed cost – Loss$(C = F - L)$

From this, the following marginal cost equation is developed:

$$S - V = F + P$$

If any three of the above four factors in the equation are known, the fourth one can be easily found out. Thus:

or

$$P = S - V - F$$
$$P = C - F$$
$$F = C - P$$
$$V = S - F - P$$

Example:

Sales = ₹12,000

Variable cost = ₹7,000

Fixed cost = ₹4,000

NOTES

Thus:

$$C = S - V$$

$$C = 12{,}000 - 7{,}000 = \text{₹}5{,}000$$

$$P = C - F$$

$$P = 5{,}000 - 4{,}000 = \text{₹}1{,}000$$

Thus profit is ₹1,000.

If sales figure is not given but contribution is given then sales can be found out as follows:

$$S = C + V$$

$$S = 5{,}000 + 7{,}000 = \text{₹}12{,}000$$

When fixed cost (F) is not given but profit is given, then:

$$F = C - P$$

$$F = 5{,}000 - 1{,}000 = \text{₹}4{,}000$$

When variable cost (V) is not given, then:

$$V = S - C$$

$$V = 12{,}000 - 5{,}000 = \text{₹}7{,}000$$

The concept of contribution is extremely helpful in the study of break-even analysis and management decision making.

Profit-Volume Ratio (P/V Ratio)

The profit/volume ratio, better known as contribution/sales ratio (C/S ratio), expresses the relation of contribution to sales.

Symbolically, P/V ratio = $\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} = \frac{C}{S} = \frac{S-V}{S}$

By transposition, we have

(i) $C = S \times \text{P/V ratio}$

(ii) $S = \frac{C}{\text{P/V ratio}}$

Example:

$$\text{Sales} = \text{₹}10{,}000$$

$$\text{Variable cost} = \text{₹}8{,}000$$

Then $\text{P/V ratio} = \frac{C}{S} = \frac{S-C}{S} = \frac{10{,}000-8{,}000}{10{,}000} = \frac{2{,}000}{10{,}000} = \frac{2}{10}$

When expressed in percentage, P/V ratio = × 100 = 20%.

When P/V ratio is given, the contribution can be quickly calculated from any given level of sales. In the above example, if only sales and P/V ratio were given, contribution could be calculated as under:

$$C = S \times \text{P/V ratio}$$

$$C = 10{,}000 \times 20\% = \text{₹}2{,}000$$

NOTES

P/V ratio may also be computed by comparing the change in contribution to change in sales (or change in profit to change in sales.) Any increase in profit will mean increase in contribution because fixed costs are assumed to remain constant at all levels of production. Thus:

$$\text{P/V ratio} = \frac{\text{Change in contribution}}{\text{Change in sales}} = \frac{\text{Change in profit}}{\text{Change in sales}}$$

Uses of P/V ratio

P/V ratio is one of the most important ratios to watch in business. It is an indicator of the rate at which profit is being earned. A high P/V ratio indicates high profitability and a low ratio indicates low profitability in the business. The profitability of different sections of the business such as sales areas, classes of customers, product lines, methods of production, etc., may also be compared with the help of profit-volume ratio. The P/V ratio is also used in making the following type of calculations:

(a) Calculation of break-even point
(b) Calculation of profit at a given level of sales
(c) Calculation of the volume of sales required to earn a given profit
(d) Calculation of profit when margin of safety is given
(e) Calculation of the volume of sales required to maintain the present level of profit, if selling price is reduced

Improvement in P/V Ratio

As P/V ratio indicates the rate of profitability, any improvement in this ratio without increase in fixed cost would result in higher profits. As a note of caution, erroneous conclusions may be drawn by mere reference to P/V ratio. therefore, this ratio should not be used in isolation.

P/V ratio is the function of sales and variable cost. Thus, it can be improved by widening the gap between sales and variable cost. This can be achieved by:

(a) Increasing the selling price
(b) Reducing the variable cost
(c) Changing the sales mix, i.e., selling more of those products, which have larger P/V ratio, thereby improving the overall P/V ratio.

6.2.2 Methods of Break Even Analysis

Break-even analysis may be performed by the following two methods:

(a) Algebraic calculations
(b) Graphic presentation

In this section, you will only learn about the algebraic calculations.

Algebraic Method (Calculations in Break-even Analysis)

Break-even point: The break-even point is the volume of output or sales at which total cost is exactly equal to sales. It is a point of no profit and no loss. This is the minimum point of production at which total cost is recovered and after this point profit begins.

The fundamental formula to calculate break-even point is:

$$\text{Break-even point (in units)} = \frac{\text{Total fixed cost}}{\text{Contribution per unit}} = \frac{F}{S - V}$$

$$\text{Break-even point (in Rupees)} = \frac{\text{Total fixed cost}}{\text{Contribution}} \times \text{Sales} = \frac{F \times S}{S - V}$$

or $$\text{Break-even point (in Rupees)} = \frac{\text{Total fixed cost}}{\text{P/V ratio}}$$

Example: Following data is given:

Total fixed cost = ₹12,000
Selling price = ₹12 per unit
Variable cost = ₹9 per unit

Thus:

Contribution = S – V
= 12 – 9 = ₹3 per unit

P/V ratio = $= \frac{C}{S} \times 100 = \frac{3}{12} \times 100 = 25\%$

Break-even point (in units)=

$$\frac{\text{Fixed cost}}{\text{Contribution per unit}} = \frac{12{,}000}{3} = 4{,}000 \text{ units}$$

Break-even point (in ₹) $= \frac{\text{Total fixed cost}}{\text{Contribution}} \times \text{Sales}$

$= \frac{12{,}000}{3} \times 12 = ₹48{,}000$

Also,

Break-even point (in ₹) $= \frac{\text{Total Fixed cost}}{\text{P/V ratio}} = \frac{₹12{,}000}{25\%} = ₹48{,}000$

Verification

Break-even point may be verified as follows:

Total cost = Fixed cost + Variable cost
Total cost = ₹12,000 + (4,000 units × ₹9)
= ₹48,000

The sales value and total cost at break-even point are exactly equal.

NOTES

Additional Calculations

In addition to the calculation of break-even point, the above formula can also be used in making certain additional calculations. These are:

1. Calculation of profit at different sales volumes
2. Calculation of sales for desired profit
3. Finding missing figures

Example: The following data is given:

Fixed cost = ₹12,000 (total)
Selling price = ₹12 per unit
Variable cost = ₹9 per unit

Calculation of profit at different sales volumes: What will be the profit when sales are (a) ₹60,000 (b) ₹1,00,000?

$$\text{P/V ratio} = \frac{C}{S} = \frac{3}{12} = 25\%$$

(a) When sales = ₹60,000

Contribution = Sales × P/V ratio

= ₹60,000 × 25% = ₹15,000

Profit = Contribution – Fixed cost

= ₹15,000 – ₹12,000 = ₹3,000

(b) When sales = ₹1,00,000

Contribution = ₹1,00,000 × 25% = ₹25,000

Profit = ₹25,000 – ₹12,000 = ₹13,000

Calculation of sales for desired profits Continuing the same figures, what will be the amount of sales if it is desired to earn a profit of (a) ₹6,000; (b) ₹15,000?

$$\text{Sales for desired profit} = \frac{\text{Fixed cost + Desired profit}}{\text{P/V ratio}}$$

(a)
$$= \frac{₹12{,}000 + ₹6{,}000}{25\%} = ₹72{,}000$$

(b)
$$= \frac{₹12{,}000 + ₹15{,}000}{25\%} = ₹1{,}08{,}000$$

NOTES

Example:

Given: Break-even point = ₹30,000

Profit = ₹1,500

Fixed cost = ₹6,000

What is the amount of variable cost?

Solution:

Contribution = Fixed cost + profit

= ₹6,000 + ₹1,500 = ₹7,500

$$\text{Break-even point} = \frac{\text{Fixed cost}}{\text{Contribution}} \times \text{Sales}$$

$$₹30,000 = \frac{6,000}{7,500} \times \text{Sales}$$

$$\text{Sales} = \frac{7,500}{6,000} \times 30,000 = ₹37,500$$

$$\text{P/V ratio} = \frac{\text{Contribution}}{\text{Sales}} \times 100 = \frac{7,500}{37,500} \times 100 = 20\%$$

Variable cost = 100 – P/V ratio

Variable cost = 100 – 20% = 80% (of sales)

∴ Variable cost (80% of sales) = ₹37,500 × 80% = ₹30,000

Variable cost at break-even sales = ₹30,000 × 80% = ₹24,000

Also, variable cost at Break-even sales= 30,000 – Fixed cost

= 30,000 – 6,000 = ₹24,000.

Example:

Sales = 4,000 units @ ₹10 per unit

Break-even point = 1,500 units

Fixed cost = ₹3,000

What is the amount of (a) variable cost; and (b) profit?

Solution:

$$\text{Break-even point (in units)} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$$1,500 = \frac{₹3,000}{\text{Contribution per unit}}$$

$$\text{Contribution per unit} = \frac{₹3,000}{1,500 \text{ units}} = ₹2$$

(a) Variable cost = Selling price – Contribution

= ₹10 – ₹2 = ₹8 per unit

Contribution at sales of 4,000 units = 4000 units × ₹2 = ₹8,000

(b) Profit = Contribution – Fixed cost

= ₹8,000 – ₹3,000 = ₹5,000

Illustration 6.1

NOTES

The following information is given:

Sales = ₹2,00,000

Variable cost = ₹1,20,000

Fixed cost = ₹30,000

Calculate (a) Break-even point

(b) New break-even point if selling price is reduced by 10%

(c) New break-even point if variable cost increases by 10%

(d) New break-even point if fixed cost increases by 10%

Solution:

$$\text{P/V ratio} = \frac{S-V}{S} = \frac{2{,}00{,}000 - 1{,}20{,}000}{2{,}00{,}000} = \frac{80{,}000}{2{,}00{,}000} \times 100 = 40\%$$

(a) Break-even point $= \frac{F}{P/V \text{ ratio}} = \frac{30{,}000}{40\%} = ₹75{,}000$

(b) When selling price in reduced by 10%, new sales = 2,00,000 – 10% = ₹1,80,000

New P/V ratio $= \frac{1{,}80{,}000 - 1{,}20{,}000}{1{,}80{,}000} = \frac{60{,}000}{1{,}80{,}000} = \frac{1}{3}$

New Break-even point $= \frac{F}{P/V \text{ ratio}} = \frac{30{,}000}{1/3} = ₹90{,}000$

(c) When variable cost increases by 10%, new variable cost

= 1,20,000 + 10% = ₹1,32,000

New P/V ratio = $\frac{2{,}00{,}000 - 1{,}32{,}000}{2{,}00{,}000} = \times 100 = 34\%$

New Break-even point= $\frac{68{,}000}{2{,}00{,}000} = ₹88{,}235$ (Approx)

(d) If fixed cost increases by 10%, new fixed cost = 30,000 + 10% = ₹33,000

P/V ratio remains unaffected at 40%

New Break-even point $= \frac{30{,}000}{34\%} = ₹82{,}500$

NOTES

Illustration 6.2

From the following particulars, find out the selling price per unit if B.E. Point is to be brought down to 9,000 units:

Variable cost per unit	=	₹75
Fixed expenses	=	₹2,70,000
Selling price per unit	=	₹100

Solution:

$$\text{Break-even point} = \frac{\text{Fixed cost}}{\text{Contribution per unit}}$$

$$\text{9,000 units} = \frac{2,70,000}{\text{Contribution per unit}}$$

$$\text{Contribution per unit} = \frac{2,70,000}{9,000} = ₹30$$

At present the contribution is ₹25 (i.e., 100 – 75). In order to bring B.E. Point at 9,000 units, contribution should be brought to ₹30. This means that selling price should be increased by ₹5. Thus, the new selling price should be ₹105.

Cash Break-even Point

When break-even point is calculated only with those fixed costs which are payable in cash, such a break-even point is known as cash break-even point. This means that depreciation and other non-cash fixed costs are excluded from the fixed costs in computing cash break-even point. Its formula is—

$$\text{Cash break even point} = \frac{\text{Cash fixed costs}}{\text{Contribution per unit}}$$

Limiting or Key Factor

The objective of a business is to earn maximum profit. However, it is not always easy to achieve this objective because profit earning is affected by a variety of factors. For example, an undertaking may have sufficient orders on hand, ample skilled labour and production capacity, but may be unable to obtain all the quantity of material it needs for the manufacture of maximum quantities which could be sold. Thus, material is the factor which limits the size of output and prevents an undertaking from maximizing its profit. Similarly, sometimes a business is not able to sell all that it can produce. In such a case, sales is the limiting factor.

NOTES

A limiting or key factor may thus be defined as the factor in the activities of an undertaking, which at a particular point in time or over a period will limit the volume of output. Examples of limiting factors are:

(i) Sales
(ii) Materials
(iii) Labour of particular skill
(iv) Production capacity or machine hours
(v) Financial resources.

The purpose of the limiting factor technique is to indicate the most profitable course of action in all such cases where alternatives are possible.

Contribution per unit of key factor—When a key factor is operating, the most profitable position is reached when contribution per unit of key factor is maximum. For instance, if a choice lies between producing product A which yields a contribution of ₹15 per unit and product B which yields a contribution of ₹20 per unit, product B would be more profitable.

If, however, product A takes 3 kg of material (which is a limiting factor) and product B takes 5 kg the respective contributions per kg of material would be:

Product A = ₹15 ÷ 3 kgs = ₹5

Product B = ₹20 ÷ 5 kgs = ₹4

product A, which gives the greater contribution in terms of per unit of limiting factor will be more profitable.

Illustration 6.3

The following data at is given:

	Product A	Product B
Direct materials	₹ 24	14
Direct labour @ ₹3 per hour	₹ 6	9
Variable overhead @ ₹4 per hour	₹ 8	12
Selling price	₹ 100	110
Standard time	2 hrs	3 hrs

State which product you would recommend to manufacture when:

(a) Labour time is the key factor
(b) Sales value is the key factor

NOTES

Solution:

	Product A ₹	Product B ₹
Selling price (S)	100	110
Direct material	24	14
Direct labour	6	9
Variable overhead	8	12
Variable cost (V)	38	35
Contribution (S – V)	62	75
(a)Contribution per labour hour	₹62 ÷ 2 hrs = ₹31	₹75 ÷ 3 hrs = ₹25
(b) Contribution per rupee of sales value	= ₹62 ÷ 100 = 62 paise	= ₹75 ÷ 110 = 68 paise

Conclusion

(a) product A is recommended when labour time is the key factor because contribution per labour hour of product A is more than that of product B.

(b) When sales value is the key factor, product B is recommended because contribution per rupee of sales value of product B is more than that of product A.

(c) When sale quantity is the key factor, product B is more profitable because its contribution per unit is higher than that of product A.

Uses of Break-even Analysis

Some of the important uses of break-even analysis are summarized below:

1. It helps in determining the break-even point.
2. It helps in determining the selling price which will give the desired profit.
3. It helps in determining the sales volume to earn a desired profit or return on capital employed.
4. It helps in determining the costs and revenue at different levels of output.
5. It helps in determining the most profitable sales mix.
6. It helps in determining comparative profitability of each product line.
7. It studies the effect of change in selling price or of price differentiation in different markets, e.g., home market and foreign market.
8. It studies the impact of increase or decrease in fixed and variable costs on profits.
9. It studies the effect on profits and break-even points of high proportion of variable costs with low fixed cost and vice-versa.

6.2.3 Margin of Safety

Margin of safety may be defined as the difference between actual sales and sales at break-even point. In other words, it is the amount by which actual volume of sales exceeds the break-even point. Margin of safety may be expressed in absolute money terms or as a percentage of sales. Thus,

M/S = Actual sales – Break-even point

Example:

	Company X	Company Y
Actual sales	₹1,20,000	60,000
Less: Break-even point	₹40,000	40,000
Margin of safety	₹80,000	20,000
Margin of safety as a % of sales	$= \frac{80,000}{1,20,000} \times 100$	$= \frac{20,000}{60,000} \times 100$
	$= 66\frac{2}{3}\%$	$= 33\frac{1}{3}\%$

The size of the margin of safety indicates soundness of a business. When margin of safety is large, it means the business can still make profits even after a serious fall in sales. In such a situation, the business stands better chance of survival in times of depression.

A large margin of safety usually indicates low fixed costs. When margin of safety is low, any loss of sales may be a matter of a serious concern.

Margin of safety is directly related to profit. This is shown below:

Profit = Margin of safety × Profit/volume ratio

P = M/S × P/V ratio

$$\text{Thus M/S} = \frac{P}{P/V \text{ ratio}}$$

If profit is 10% and P/V ratio is 40%, then

$$\text{M/S} = \frac{10\%}{40\%} = 25\%$$

When actual sales are given—

Profit = M/S ratio × P/V ratio × Actual sales

When profit is not known but M/S is known, then

P = M/S × P/V ratio

P = 25% × 40% = 10%

NOTES

Illustration 6.4

Calculate margin of safety in each of the following independent situations:

(i) Break-even point 40%, Actual sales ₹40,000

(ii) Actual sales – 40,000 units, Break-even point 25,000 units

(iii) Break-even point – 75%

(iv) P/V ratio 40%, Profit ₹35,000

(v) Contribution per unit ₹20, Profit ₹15,000

Solution:

(i) Margin of safety = Actual sales – B.E. Point

= ₹40,000 – 40% = ₹24,000

(ii) Margin of safety = Actual sales – B.E. point

= 40,000 units – 25,000 units = 15,000 units

(iii) Margin of safety = 100 – B.E. Point = 100 – 75% = 25%

(iv) Margin of safety $= \frac{\text{Profit}}{\text{P/V ratio}} = \frac{3,500}{40\%} =$ ₹87,500

(v) Margin of safety $= \frac{\text{Profit}}{\text{Contribution per unit}} = \frac{15,500}{20\%}$ = 750 units

Improvement in M/S: When margin of safety is not satisfactory, the following steps may be taken to improve it:

(a) Increase the volume of sales; (b) Increase the selling price; (c) Reduce fixed cost; (d) Reduce variable cost; (e) Improve sales mix by increasing the sales of products with larger P/V ratio.

The effect of a price reduction is always to reduce P/V ratio, raise the break-even point and shorten the margin of safety.

This is illustrated on the following page:

Example:

Suppose price is reduced from ₹75 to ₹60, variable cost ₹50 per unit, fixed cost 10,000, calculate margin of safety.

NOTES

	Beforeprice reduction ₹	After price reduction ₹
Selling price per unit (S)	75	60
Variable cost per unit (V)	50	50
Total fixed cost (F)	10,000	10,000
Contribution (S – V)	25	10
P/V ratio	$\frac{25}{75}=\frac{1}{3}$	$\frac{10}{60}=\frac{1}{6}$
Break-even point $\left(\frac{F}{P/V\ ratio}\right)$	$=\frac{10,000}{1/3}$	$=\frac{10,000}{1/6}$
	= 30,000	= 60,000
Actual sales (assumed)	75,000	75,000
M/S (Actual sales – B.E. Point)	75,000 – 30,000	75,000 – 60,000
= 45,000	= 15,000	

Check Your Progress

1. How can improvement in P/V ration be achieved?
2. What is cash break-even point?
3. How is margin of safety generally expressed?

6.3 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. P/V ratio is the function of sales and variable cost. Thus, it can be improved by widening the gap between sales and variable cost. This can be achieved by:
   - Increasing the selling price
   - Reducing the variable cost
   - Changing the sales mix, i.e., selling more of those products, which have larger P/V ratio, thereby improving the overall P/V ratio.
2. When break-even point is calculated only with those fixed costs which are payable in cash, such a break-even point is known as cash break-even point.
3. Margin of safety may be expressed in absolute money terms or as a percentage of sales.

NOTES

6.4 SUMMARY

- Cost-volume-profit (CVP) analysis or break-even analysis is a powerful tool of profit planning based on marginal costing approach.
- CVP analysis is 'the study of the effects on future profits of changes in fixed cost, variable cost, sales price, quantity and mix.'
- In order to properly understand CVP analysis, it is essential to understand concepts like contribution, P/V ratio, margin of safety, angle of incidence and key factors.
- Contribution is the difference between selling price and variable cost, while P/V ratio shows the relationship between contribution and sales.
- P/V ratio helps in calculating the break even point and also calculation of sales for achieving desired level of profit, etc.
- Break-even point is that level of sales where there is no profit and no loss.
- Break-even analysis can be performed with the help of algebraic formulae or by graphic presentation in break-even charts.
- The difference between actual sales and break-even sales is margin of safety. A large margin of safety indicates that the business can still make profit when there is a serious fall in its sales.

6.5 KEY WORDS

- **Cost-volume-profit analysis:** It is an extension of marginal costing which studies the interrelationship of three basic factors of business operations, i.e., cost of production, volume of production and profit.
- **Profit-volume ratio:** It expresses the relation of contribution to sales.
- **Break even point:** It refers to the volume of output or sales at which total cost is exactly equal to sales.
- **Margin of safety:** It may be defined as the difference between actual sales and sales at break-even point.

6.6 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. Write a short note on cost-volume-profit analysis.
2. What are the assumptions underlying break-even analysis?
3. List the uses of break-even analysis.
4. What is margin of safety? What are the steps that can be taken in case it is not satisfactory?

Long Answer Questions

1. Explain the concept of profit-volume ratio.
2. Describe the algebraic calculation in break-even analysis.
3. Haryana Tractors Ltd have an installed capacity of 5,000 tractors per annum. They are presently operating at about 35 per cent of installed capacity. For the coming year, they have budgeted as follows:

   Production/sales 4,000 units

Costs:	₹ (crores)
Direct materials	8.00
Direct wages	0.60
Factory expenses	0.80
Administrative expenses	0.20
Selling expenses	0.20
Profit	1.00

   Factory expenses as well as selling expenses are variable to the extent of 20 per cent. Calculate the break-even capacity utilization percentage.
4. The following information is provided of MIZ Co. Ltd.

Year	2011	2012
Sales	₹ 32,00,000	₹ 57,00,000
Profit/(Loss)	₹ (3,00,000)	₹ 7,00,000

   Calculate:

   (*a*) P/V Ratio

   (*b*) Total fixed cost,

   (*c*) Sales required to earn a profit of ₹ 12,00,000
5. The Radio Manufacturing Co. finds that while it costs ₹ 6.25 to make component *X* the same is available in the market at ₹ 5.75 each, with an assurance of continued supply. The break-down of the cost is:

Materials	₹ 2.75	each
Labour	₹ 1.75	each
Other variables	₹ 0.50	each
Deprecation and other fixed cost	₹	1.25
each		
	₹	6.25
each		

   (*a*) Should you make or buy?

   (*b*) What would be your decision, if the supplier offered the component at ₹ 4.85 each?

6.7 FURTHER READINGS

NOTES

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 7 ANALYSIS AND INTERPRETATION OF FINANCIAL STATEMENTS

Structure

7.0 INTRODUCTION

The fundamental, clear and definite understanding of financial statements is recognized as a prerequisite for an accurate, complete and relevant financial decision. However, this does not mean that decision makers like a business executive, commercial or investment banker, or investor, speculator, business counsellor, mercantile creditman, or financial analyst need to master themselves in the preparation of these statements. In fact, qualified financial accountants capable of preparing such statements are available almost everywhere in the world. But the unchallenged ability to interpret these financial statements intelligently and accurately are essential to understand the financial status and performance of a business.

7.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning and steps of financial statement analysis;
- Describe the objective of financial statement analysis
- Examine the techniques of financial statement analysis.

NOTES

7.2 ANALYSIS AND INTERPRETATION OF FINANCIAL STATEMENTS

Like lines in the palm or horoscope, financial statements can be studied, puzzled over, and scrutinized (Woelfel, 1980). The analysis of such statements provide valuable information for managerial decisions. Financial statement is—as nearly as the financial executive can make it so—simply a report of facts. The utility of the statement does not lie in the amount of information it contains but in the expertise and the skill of the analyst to analyse and interpret the information in the statement in order to get the story behind the facts—to read between the lines. Financial statement does not speak anything in and of itself. It merely contains financial data about business events. The user gains meaningful insights and conclusions about the firm only through his own analysis and interpretation of the information in the statements (Woelfel, 1908).

Financial statement analysis involves a systematic and careful examination of the information contained in the financial statements with a definite purpose. It is a detailed inquiry into financial data to evaluate an organization's performance, future risks and potential. It attempts to determine the significance and meaning of the business information as depicted by financial statements so that prospects for future earnings, ability to pay interest and debt maturities (both current and long-term) and profitability of a sound dividend policy may be forecast. According to Myer, 1969 Financial statement analysis is largely *a study of relationships among the various financial factors in a business, as disclosed by a single set of statements and study of these factors as shown in a series of statements.*

Thus, financial statement analysis is a process of analysing the financial data in order to judge the profitability and financial position of an organization. It is the evaluation of the economic and financial data presented in the financial statements for making decisions and maintaining control.

7.2.1 Steps Involved in Financial Statements Analysis

The process of financial statement analysis consists of the following six steps:

- determination of scope and objectives of analysis;
- study of financial statements;
- collection of relevant information;
- rearrangement of the data;
- analysis of data by analytical techniques; and
- interpretation, presentation and preparation of reports.

NOTES

7.2.2 Objectives and Importance of Financial Analysis

Financial statement analysis performs the essential function of converting mass data into useful information. Such analysed financial information serves many and varied purposes, as described below:

1. **Judging profitability:** Profitability is a measure of the efficiency and success of a business enterprise. A company which earns profits at a higher rate is definitely considered a good company by the potential investors. The potential investors analyse the financial statements to judge the profitability and earning capacity of a company so as to decide whether to invest in a company or not.
2. **Judging liquidity:** Liquidity of a business refers to its ability to pay off its short-term liabilities, when they become due. Short-term creditors, like trade creditors and bankers, make an assessment of liquidity before granting credit to the company.
3. **Judging solvency:** Solvency refers to the ability of a company to meet its long-term debts. Long-term creditors, like debenture-holders and financial institutions, judge the solvency of a company before any lending decisions. They analyse company's profitability over a number of years and its ability to generate sufficient cash to be able to repay their claims.
4. **Judging the efficiency of management:** Performance and efficiency of management of a company can be easily judged by analysing its financial statements. Profitability of a company is not the only measure of company's managerial efficiency. There are a number of other ways to judge the operational efficiency of management. Financial analysis tells whether the resources of the business are being used in the most effective and efficient way.
5. **Inter-firm comparison:** A comparative study of financial and operating efficiency of different firms is possible only after proper analysis of their financial statements. For this purpose, it is also necessary that the financial statements are maintained on a uniform basis so that financial data of various firms are comparable.
6. **Forecasting and budgeting:** Financial analysis is the starting point for making plans by forecasting and preparing budgets. Analysis of the financial statements of the past years helps a great deal in forecasting for the future.

7.2.3 Types of Financial Analysis

The methods of financial analysis are divided into different types: horizontal, vertical, internal and external.

NOTES

Horizontal and Vertical Analysis

In horizontal analysis, financial date of two or more years of the company is presented horizontally in a number of columns in comparative form. *Comparative financial statements* and *trend percentages* are types of horizontal analysis.

Vertical analysis covers a period of only one year and analysis is made on the basis of one set of financial statements. *Common size financial statements* and *ratio analysis* are the techniques employed in vertical analysis.

Internal and External Analysis

In external analysis the outside parties including the likes of government agencies, suppliers, creditors, investors etc. undertake a study based on the reports and information published by the management itself. They have no access to internal records and accounting policies.

Internal analysis is undertaken by the management of the company, to analyse their performance vis a vis the set objectives. This type of analysis is slightly more reliable as it based on the internal policies and reports.

Check Your Progress

1. What does a financial statement analysis attempt to determine?
2. What does the financial analysis serve as a starting point for?
3. Give some examples of vertical analysis.

7.3 TECHNIQUES OF ANALYSIS

Over the past few decades a number of techniques have been developed for the analysis of financial statements. The selection of appropriate analytical technique generally depends upon the purpose of the analysis. Usually analysts prefer to use such techniques in combination to ensure better results. The commonly used techniques are:

- comparative financial statement;
- common-size statement;
- trend analysis;
- ratio analysis;
- fund flow statements; and
- cash flow statements

NOTES

In the subsequent sections of the unit, an attempt is made to discuss in detail the first three techniques *i.e.*, comparative financial statement, common-size statement, and trend analysis.

7.3.1 Comparative Financial Statements

Any financial statement that reports the comparison of data for two or more consecutive accounting periods is known as comparative financial statement. Commenting on the nature of comparative financial statements Foulke, 1961 states that such statements which basically reveal the financial position of the business are designed in such a form as to provide time prospective to the consideration of various elements of financial position embodied in such statements.

In fact, comparative financial statements highlight trends and establish relationship between items that appear on the same row of the statement. Such statements disclose changes in the items of the statement with time in both rupees and percentage. Each item (such as debtors) on a row for one fiscal period is compared with the same item in a different period. The analyst calculates the absolute changes—the difference between the figures of one year and the next—and also the percentage change from one year to the next, using the earlier year as the base year. Much valuable information is obtained from financial statements in this manner. The comparative study helps an analyst to identify and examine the key factors which have affected profitability or the financial position of the organization.

Illustration 7.1 From the following balance sheet of Saher Ltd. prepare a comparative balance sheet and comment on the financial position of the concern.

Saher Ltd.
Balance Sheet

Liabilities	*2011* ₹	*2012* ₹	*Assets*	*2011* ₹	*2012* ₹
Equity shares	2,20,000	2,50,000	Buildings	1,40,000	1,70,000
Debentures	1,00,000	1,20,000	Machinery	1,20,000	1,50,000
Reserves and surplus	60,000	80,000	Furniture	60,000	40,000
Sundry creditors	40,000	25,000	Sundry debtors	40,000	60,000
Bills payable	35,000	40,000	Marketing Securities	55,000	30,000
Outstandings	20,000	–	Stock	40,000	55,000
(Misc. exp)			Cash balances	20,000	10,000
	4,75,000	5,15,000		4,75,000	5,15,000

NOTES

Solution

Comparative Balance Sheet

(*As on 31st December, 2011 and 2012*)

Particulars	*31st December*		*Increase or Decrease in Amount*	*Increase or Decrease in Percentage*
	2011 ₹	*2012* ₹	₹	₹
Assets				
A. *Current Assets*				
Sundry debtors	40,000	60,000	+ 20,000	+ 50.00
Marketable securities	55,000	30,000	– 25,000	– 45.45
Stock	40,000	55,000	+ 15,000	+ 37.50
Cash balances	20,000	10,000	– 10,000	– 50.00
Total (A)	1,55,000	1,55,000	–	–
B. *Fixed Assets*				
Buildings	1,40,000	1,70,000	+ 30,000	+ 21.43
Machinery	1,20,000	1,50,000	+ 30,000	+ 25.00
Furniture	60,000	40,000	– 20,000	– 33.33
Total (B)	3,20,000	3,60,000	+ 40,000	+ 12.50
Total Assets (A + B)	4,75,000	5,15,000	40,000	8.42
Liabilities				
C. *Current Liabilities*				
Sundry creditors	40,000	25,000	– 15,000	– 37.50
Bills payable	35,000	40,000	+ 5,000	+ 14.29
Outstanding (Misc. exp)	20,000	–	– 20,000	– 100.00
Total (C)	95,000	65,000	– 30,000	– 31.58
D. *Long-term Liabilities*				
Equity shares	2,20,000	2,50,000	+ 30,000	+ 13.64
Debenture	1,00,000	1,20,000	+ 20,000	+ 20.00
Reserves and surplus	60,000	80,000	+ 20,000	+ 33.33
Total (D)	3,80,000	4,50,000	+ 70,000	+ 18.42
Total Liabilities (C + D)	4,75,000	5,15,000	+ 40,000	+ 8.42

Interpretation

The analysis of the above comparative balance sheet (*see* Illustration 7.1) reveals that the monetary balance in each account has increased between the end of 2011 and 2012 with an exception of marketable securities, cash balances, furniture, sundry creditors and outstanding. The significant changes which have occurred in specific balance sheet accounts during the two-year period are:

- There is 50 per cent increase in sundry debtors, 37.5 per cent increase in stock, 45.45 per cent decrease in marketable securities and 50 per cent decrease in cash balances. Slower paying customers and/or slower moving merchandise might be responsible for the changes.
- There has been no change in the amount of current assets during the two periods but current liabilities have decreased by 31.58 per cent. This change has contributed to the liquidity of the company.

NOTES

- There has been increase in share capital and debentures by 13.64 per cent and 20 per cent, respectively. All this might be due to fresh issue of shares and debentures.
- The increase in fixed assets during the two periods has been 12.5 per cent. The increase in fixed assets does not sound financially sound when compared with the amount of current assets that has remained constant during the period under study.

Illustration 7.2 The income statements of a concern are given for the years ending on 31st December, 2011 and 2012. You are required to prepare a comparative income statement and interpret the changes.

Solution

Income Statements for the Year Ending 2011 and 2012

Comparative Income Statement

(for the year ended 31st December, 2011 and 2012)

Particulars	*31st December*		*Increase or Decrease in Amount*	*Increase or Decrease in Percentage*
	2011 ₹	*2012* ₹	₹	₹
Net sales	6,50,000	7,25,000	+ 75,000	+ 11.54
Less: Cost of goods sold	4,25,000	5,00,000	+ 75,000	+17.65
Gross Profit	2,25,000	2,25,000	–	–
Operating Expenses:				
Selling & distribution expenses	60,000	75,000	+ 15,000	+ 25.00
General Expenses	25,000	40,000	+ 15,000	+ 60.00
Total Operating Expenses	85,000	1,15,000	+ 30,000	+ 35.29
Operating Profit	1,40,000	1,10,000	– 30,000	– 21.43

Interpretation

A cursory study of the above comparative income statement (*see* Illustration 7.2) reveals the following:

- There is significant change in the operating profit in comparison to other items of the income statement as it has declined by 21.43 per cent during the period under study.
- Although the amount of net sales has increased by 11.54 per cent during the period under study yet the cost of goods sold has increased by 17.65 per cent that has neutralized the benefit gained from the increase in sales. Consequently, the amount of gross profit has remained constant.
- The increase in operating expenses during the period which has been registered an increase of 35.29 per cent is due to increase in selling and distribution, and general expenses which have registered an increase of 25 per cent and 60 per cent, respectively during the period.

NOTES

7.3.2 Common Size Statement

Financial statements that depict financial data in the shape of vertical percentage are known as common size statements. Since such statements provide the readers with a vertical analysis of the items of profit and loss account and balance sheet, the values of the items are converted into a common unit by expressing them as a percentage of a key figure in the statement. Therefore, the total of financial statement is reduced to 100 and each item of the statement is shown as a component of the whole. For example, in profit and loss account, the value of each item is expressed as a percentage of sales. In the same way, the assets and liabilities can be shown as percentage of total assets and total liabilities, respectively, in a common-sized balance sheet. Since in common size statements each monetary item of the financial statement is expressed as a percentage of the sum total of which that item is a part, such an attempt is referred to as common size statement. Consequently, such statements not only show the relative significance of the items contained in the financial statements but also facilitates comparison. Common size statements are recognized as valuable management tool as they reveal both efficiencies and inefficiencies that are otherwise difficult to identify. However, a common size statement is especially useful when data for more than one year are used.

Illustration 7.3 The balance sheets of Shaheen Ltd. are given for the year 2011 and 2012. Convert them into common-sized balance sheet and interpret the changes.

Balance Sheet

Liabilities	*2011* ₹	*2012* ₹	*Assets*	*2011* ₹	*2012* ₹
Equity share	1,46,800	1,91,000	Buildings	1,80,000	2,00,000
Capital reserve	50,000	70,000	Plant and Machinery	40,000	55,000
Revenue reserve and surplus	20,000	30,000	Furniture	10,000	20,000
Trade creditors	30,000	40,000	Freehold Property	20,000	12,000
Bills payable	80,000	60,000	Goodwill	25,000	30,000
Bank overdraft	90,000	80,000	Cash balance	25,000	20,000
Provisions	30,000	20,000	Sundry Debtors	30,000	35,000
			Inventories	70,000	57,000
			Investment (temporary)	36,500	42,000
			Bills receivable	10,300	20,000
	4,46,800	4,91,000		4,46,800	4,91,000

NOTES

Solution

Common-size Balance Sheet

(as on 31st December 2011 and 2012)

	2011 Amount ₹	Percentage	2012 Amount ₹	Percentage
Assets				
A. *Current Assets*:				
Cash balances	25,000	5.59	20,000	4.07
Sundry debtors	30,000	6.71	35,000	7.13
Inventories	70,000	15.67	57,000	11.60
Investments (Temporary)	36,500	8.17	42,000	8.55
Bills receivable	10,300	2.30	20,000	4.08
Total (A)	1,71,800	38.44	1,74,000	35.43
B. *Fixed Assets:*				
Building	1,80,000	40.29	2,00,000	40.75
Plant and machinery	40,000	8.95	55,000	11.20
Furniture	10,000	2.24	20,000	4.07
Freehold property	20,000	4.48	12,000	2.44
Goodwill	25,000	5.60	30,000	6.11
Total (B)	2,75,000	61.56	3,17,000	64.57
Total Assets (A + B)	4,46,800	100.00	4,91,000	100.00
Liabilities				
C. *Current Liabilities:*				
Trade creditors	30,000	6.71	40,000	8.15
Bills payable	80,000	17.91	60,000	12.22
Bank overdraft	90,000	20.14	80,000	16.29
Provisions	30,000	6.71	20,000	4.07
Total (C)	2,30,000	51.47	2,00,000	40.73
D. *Long-term Liabilities:*				
Equity share	1,46,800	32.86	1,91,000	38.90
Capital reserve	50,000	11.19	70,000	14.26
Revenue reserve and surplus	20,000	4.48	30,000	6.11
Total (D)	2,16,800	48.53	2,91,000	59.27
Total Liabilities (C + D)	4,46,800	100.00	4,91,000	100.00

Interpretation

- The study of the above common size balance sheet (*see* Illustration 7.3) shows that 61.56 per cent of the total assets in 2011 were fixed. This percentage increased to 64.57 per cent in 2012. If the organization requires considerable investment in fixed assets, these percentages might be acceptable. However, if the organization needs liquid assets, the interested parties might have cause to be concerned about the decreasing trend of liquidity.
- There has been a major shift from the use of creditors' provided funds to the use of owner's equity funds. In 2011, external equity (current liabilities) and owner's equity (long-term liabilities) accounted for 51.47 per cent and

48.53 per cent, respectively, of the total equities. In 2012, these percentages changed to 40.73 per cent for external equities and 59.27 per cent for owners' equity. These changes indicate that the organization has used more internal sources than external sources in the generation of funds for the business during the period under study.

- The organization has not only succeeded in reducing its current liabilities from 51.47 per cent in 2011 to 40.73 per cent in 2012 of their respective total equities but it has also increased the percentage of its revenue reserve and surplus from 4.48 per cent in 2011 to 6.11 per cent in 2012 of their respective total equities.

Illustration 7.4 From the income statement given below, you are required to prepare a common-sized Income Statement.

Income Statements

(for the year ending 31st Dec, 2011 & 2012)

Particulars	*2011* ₹	*2012* ₹
Sales	1,40,000	1,65,000
Less: Cost of goods sold	85,000	1,05,000
Gross Profit	55,000	60,000
Operating Expenses:		
Selling & Distribution expenses	12,000	16,000
Administrative expenses	10,000	11,000
Total Operating Expenses	22,000	27,000
Net income before tax	33,000	33,000
Income-tax (40%)	13,200	13,200
Net Income	19,800	19,800

Solution

Common Size Income Statement

(*for the year ending 2011 and 2012*)

Particulars	*2011*		*2012*	
	Amount ₹	*Percentage*	*Amount* ₹	*Percentage*
Sales	1,40,000	100.00	1,65,000	100.00
Less: Cost of sales	85,000	60.72	1,05,000	63.63
Gross Profit	55,000	39.28	60,000	36.37
Operating Expenses:				
Selling & distribution expenses	12,000	8.57	16,000	9.70
Administrative expenses	10,000	7.14	11,000	6.67
Total Operating Expenses	22,000	15.71	27,000	16.37
Net Income before tax	33,000	23.57	33,000	20.00
Income-tax (40%)	13,200	9.42	13,200	8.00
Net Income after tax	19,800	14.15	19,800	12.00

NOTES

Interpretation

The study of the above-mentioned common size income statement (*see* Illustration 7.4) reveals the following facts:

- Out of every rupee of sales 60.72 per cent in 2011 and 63.63 per cent in 2012 accounted for cost of goods sold.
- The percentage ratio of gross profit to sales was 39.28 per cent in 2011 and the same was reduced to 36.37 per cent in 2012.
- The operating expenses increased from 15.71 per cent of sales in 2011 to 16.37 per cent in 2012. All this reduced the percentage ratio of net income after tax to sales from 14.15 per cent in 2011 to 12 per cent in 2012.

In the ultimate analysis, it can be concluded that the operating efficiency of the organization has not been satisfactory during the period under study.

Comparative Statement Versus Common Size Statement

Although both statements aims to help managers in decision making yet they differ both in terms of format and approach. The major differs between the two statements are summarized in Table 7.1.

Table 7.1 *Comparison of Comparative Statement and Common Size Statement*

Areas of Comparison	*Comparative Statement*	*Common-size Statement*
Approach	• Discloses changes in the items of a financial statement over time in both rupees and percentage form.	• Converts items of a financial statement to a common unit by expressing them as a percentage of a key figure in the statement.
Type of Analysis	• Since it studies the same item related to two consecutive periods, it is recognized as horizontal analysis.	• As the study involves a single financial period, it is known as vertical analysis.
Popularity	• Highly popular among the business firms.	• Few firms prefer to use this analysis; hence, it has limited application.
Requirements	• Calls for the financial statements related to two consecutive financial periods.	• Needs financial statements of a single financial period.
Significance of Items	• Fails to indicate the significance of an item of a financial statement as a component of a key figure in the statement.	• Highlights the significance of each item of a financial statement as a component of a key figure in the statement.

7.3.3 Trend Analysis

Trend analysis is recognized as one of the important tools of financial data analysis. Such an analysis, in fact, calls for the computation of percentage changes for different variables over a long period with an aim to have a comparative study of the variables. The trend percentages help the analyst to study the changes that have occurred during the period under study. Such an analysis indicates the progress of business by showing ups and downs in its activities. The calculation of trend percentages involves the following steps:

NOTES

- Selection of base year;
- Assigning a weight of 100 to the value of the variable of base year; and
- Expressing the percentage change in the value of variable from base year to the study year as shown below.

Year	Sales	Percentage (+) Increase or (–) Decrease
2006	20,000	100 (Base year)
2007	35,000	175
2008	28,000	140
2009	30,000	150
2010	35,000	175
2011	14,000	70
2012	22,000	110

A trend for a single financial item is seldom very informative. A comparison of trends for related items often help the analyst in perfect understanding of the business facts as is clear from the below-mentioned comparative balance sheet.

Comparative Balance Sheet

Assets	*2007* ₹	*2008* ₹	*2009* ₹	*Trend Percentage (Base Year-2001)*		
				2007	*2008*	*2009*
A. *Current Assets:*						
Inventory	20,000	30,000	25,000	100	150	125
Debtors	30,000	50,000	60,000	100	167	200
Cash balances	20,000	35,000	30,000	100	175	150
Total (A)	70,000	1,15,000	1,15,000	100	164	164
B. *Fixed Assets:*						
Building	2,50,000	3,00,000	3,00,000	100	120	120
Plant	1,25,000	1,50,000	1,60,000	100	120	128
Investment	80,000	1,00,000	1,20,000	100	125	150
Total (B)	4,55,000	5,50,000	5,80,000	100	121	127
Total Assets (A + B)	5,25,000	6,65,000	6,95,000	100	127	132

Illustration 7.5 Calculate the trend percentage from the following figures of X Ltd. taking 2008 as the base and interpret them.

(₹ *in lakhs*)

Year	Sales	Stock	Profit Before Tax
2008	1,881	709	321
2009	2,340	781	435
2010	2,655	816	458
2011	3,021	944	527
2012	3,768	1,154	672

NOTES

Solution

Trend Percentages

Year	Sales Rupees in Lakhs	Stock Rupees in Lakhs	Profit Before Tax Rupees in Lakhs	Trend Percentage		
				Sales	Stock	Profit Before Tax
2008	1,881	709	321	100	100	100
2009	2,340	781	435	124	110	136
2010	2,655	816	458	141	115	143
2011	3,021	944	527	161	133	164
2012	3,768	1,154	672	200	162	209

Interpretation

The study of the above-given statement (*see* Illustration 7.5) of trend percentage reveals that:

- The sales of the firm has continuously increased over a period of five years commencing from 2008. However, there has been a substantial increase in the amount of sales in the year 2012 when it increased by 39 per cent.
- The trend of stock is also upwards. Although the increase in this item has been constant yet in 2012 the increase has been exceptionally high.
- The profits of the firm has increased at a much higher rate in comparison to increase in sales and stock during the period under study.

The overall analysis of the financial items indicated that the organization is doing well, and therefore, its financial position is bound to be good.

Illustration 7.6 You are given the following common size percentage of AB Co. Ltd. for 2011 and 2012.

	2011	*2012*
Inventory	5.20	5.83
Debtors	10.39	?
Cash	?	7.35
Machinery	49.35	45.35
Building	27.27	29.59
Creditors	20.78	?
Overdraft	?	10.81
Total Current Liabilities	31.17	?
Capital	51.95	49.67
Long-term loan	16.88	17.91
Total Liabilities	3,85,000	4,63,000

From the above information, compute the missing common size percentages. Also calculate the value of all items of assets and liabilities.

NOTES

Solution

Common Size Balance Sheet

(*as on 31st December 2011 and 2012*)

	2011		2012	
	Amount ₹	*Percentage*	*Amount* ₹	*Percentage*
Assets				
A. *Current Assets:*				
Inventory	20,000	5.20	27,000	5.83
Debtors	40,000	10.39	55,000	11.88(iii)
Cash	30,000	7.79(i)	34,000	7.35
Total A	90,000	23.38	1,16,000	25.06
B. *Fixed Assets:*				
Machinery	1,90,000	49.35	2,10,000	45.35
Building	1,05,000	27.27	1,37,000	29.59
Total B	2,95,000	76.62	3,47,000	74.94
Total Assets (A + B)	3,85,000	100.00	4,63,000	100.00
Liabilities				
C. *Current Liabilities:*				
Creditors	80,000	20.78	1,00,000	21.59
Overdraft	40,000	10.39(ii)	50,000	10.81
Total (C)	1,20,000	31.17	1,50,000	32.40
D. *Long-term Liabilities:*				
Capital	2,00,000	51.95	2,30,000	49.68
Loan	65,000	16.88	83,000	17.92
Total (D)	2,65,000	68.83	3,13,000	67.60
Total Liabilities (C + D)	3,85,000	100.00	4,63,000	100.00

Note: Calculations have been made to the nearest rupee

(i) Calculation of percentage of cash for 2011

Cash = 23.38* – 15.59**
= 7.79

* Current asset = Total asset – Fixed asset
= 100 – 76.62 = 23.38

** Inventory + Debtors = 5.20 + 10.39 = 15.59

(ii) Calculation of percentage of overdraft for 2011

Total current liabilities – Creditors
31.17 – 20.78 = 10.39

(iii) Calculation of percentage of Debtors for 2012

Debtors = 25.06* – 13.18 = 11.88

* Current assets = Total assets – Fixed assets = 100 – 74.94 = 25.06

Check Your Progress

4. Name the financial statement that highlight trends and establish relationship between items that appear on the same of the statement.
5. Why is common-size statement known as vertical analysis?

7.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. A financial statement analysis attempts to determine the significance and meaning of the business information as depicted by financial statements so that the prospects for future earnings, ability to pay interest and debt maturities and profitability of a sound dividend policy may be forecast.
2. Financial analysis serves as a starting point for making plans by forecasting and preparing budgets.
3. Common size financial statements and ratio analysis are examples of vertical analysis.
4. Comparative financial statements are the statements that highlight trends and establish relationship between items that appear on the same of the statement.
5. Common-size statements are called vertical analysis because the study involves a single financial period.

7.5 SUMMARY

- The fundamental, clear and definite understanding of financial statements is recognized as prerequisite for an accurate, complete and relevant financial decision.
- Financial statement analysis involves a systematic and careful examination of the information contained in the financial statements with a specific purpose.
- Financial statement analysis helps in the following objectives: Judging profitability, liquidity, solvency, efficiency of management, interfirm comparison and purchasing and budgeting.
- The methods of financial analysis are divided into different types: horizontal, rertical, internal and external.
- Comparative financial statement reports comparing data of two or more consecutive accounting periods is known as comparative financial statement.

- Common size statements depicting financial data in the shape of vertical percentage are known as common size statements.
- Trend analysis which is one of the important tools of analysing financial data computes the percentage changes for different variables over a long period and then makes a comparative study of them.

7.6 KEY WORDS

- **Financial statements:** It refers to the reporting instruments that provide a summary of the accounting data of an organization's business pertaining to a specific accounting period.
- **Financial statement analysis:** It is a process of analysing the financial data in order to judge the profitability and financial position of an organization.
- **Comparative financial statement:** It refers to any financial statement that reports the comparison of data for two or more consecutive accounting periods.
- **Common size statement:** It is a financial statement that depicts financial data in the shape of vertical percentage.
- **Trend analysis:** It refers to the computation of percentage changes for different variable over a long period with an aim to have a comparative study of the variables.

7.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answers Questions

1. What are the steps involved in financial statement analysis?
2. Distinguish between horizontal and vertical analyses of financial statement data.
3. Why might it be unwise to predict a firm's financial future based on trends derived from historical financial information?
4. Write short notes on:

   (a) Comparative financial statements

   (b) Trend analysis

   (c) Qualifications of financial analyst

NOTES

Long-Answers Questions

1. Define financial statement analysis. Explain in what ways may such an analysis benefit managerial personnel, owners and creditors.
2. What do you understand by comparative financial statements? What information is required to prepare a comparative balance sheet.
3. Explain the procedure of preparing a common size balance sheet.
4. The following are the balance sheets of a concern as on 31st December, 2011 and 2012.

Liabilities	2011 ₹	2012 ₹	Assets	2011 ₹	2012 ₹
Sundry creditors	55,000	83,000	Cash	25,000	18,000
Bills payable	20,000	16,000	Sundry debtors	1,60,000	2,00,000
Provision for taxation	40,000	50,000	Bills receivable	20,000	30,000
Proposed dividend	42,000	50,000	Stock in trade	77,000	1,09,000
6% Debentures	1,50,000	1,00,000	Machinery	80,000	2,00,000
General reserve	40,000	70,000	Building	2,00,000	1,70,000
Profit and loss A/c	30,000	48,000	Goodwill	1,15,000	90,000
Capital	3,00,000	4,00,000			
Total	6,77,000	8,17,000		6,77,000	8,17,000

Prepare a comparative balance sheet of the concern and study its financial position.

5. Convert the following balance sheets into common size balance sheet and make brief comments

Balance Sheets

(*as on 31st March 2011 and 2012*)

Liabilities	2011 ₹	2012 ₹	Assets	2011 ₹	2012 ₹
Share capital	5,00,000	6,50,000	Machinery	2,80,000	3,20,000
6% Debentures	3,40,000	2,00,000	Building	3,50,000	3,50,000
Sundry creditors	1,60,000	67,000	Investment	2,40,000	2,65,000
Provision for doubtful debts	4,500	3,000	Goodwill	70,000	55,000
Profit & loss A/c	75,500	1,65,000	Bank balance	40,000	30,000
			Inventory	60,000	40,000
			Bills receivable	40,000	25,000
	10,80,000	10,85,000		10,80,000	10,85,000

Following income statements of a business are given for the years ending 31st December, 2011 and 2012. Prepare a common size statement and make comments on the business results.

NOTES

Income Statements

(*for the years ending on* 31*st Dec*, 2011 *and* 2012)

Particulars	*2011* ₹	*2012* ₹
Gross sales	7,20,000	8,40,000
Sales returns & allowances	40,000	50,000
Net Sales	6,80,000	7,90,000
Cost of goods sold	5,00,000	5,80,000
Gross Profit from Sales	1,80,000	2,10,000
Operating Expenses		
Selling Expenses:		
Advertising expenses	10,000	12,000
Sales salaries	12,000	16,000
Delivery expenses	7,000	5,000
Depreciation expenses	10,000	16,000
Total Selling Expenses	39,000	49,000
General and Administrative Expenses:		
Office salaries	50,000	75,000
Insurance	20,000	35,000
Depreciation	5,000	16,000
Bad debts	3,000	12,000
Total General and Administrative Expenses	78,000	1,38,000
Total Operating Expenses	1,17,000	1,87,000
Operating Income	63,000	23,000

7.8 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 8 RATIO ANALYSIS

NOTES

Structure

8.0 INTRODUCTION

The preceding unit examined not only the nature and significance of financial statements in measuring financial performance of an organization but also the application of the data contained in the statements for managerial decisions. This unit continues financial statement analysis by focusing on financial ratios. Ratio analysis is one of the popular tools of financial statement analysis. Such an analysis aims to reduce the large number of items involved to a relatively small set of readily comprehended and economically meaningful indicators. However, given the large number of ratios available, it is difficult to discern the inter-relationships among them required for a comprehensive understanding of the entity being analysed. What is required is an integrated system of financial ratios which will incorporate the essential ratios and highlight the inter-relationships among them.

8.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning of ratio analysis
- Describe the limitations of ratio analysis
- Examine the classification of ratios;

8.2 RATIO ANALYSIS: MEANING, ADVANTAGES AND LIMITATIONS

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In simple words, a ratio is the quotient formed when one magnitude is divided by another measured in the same unit. A ratio is defined as *the indicated quotient of two mathematical expressions* and as *the relationship between two or more things*. Usually the ratio is stated as a percentage, *i.e.,* distribution expenses might be stated as 20 per cent of sales. Often, however, the ratio is expressed in units, thus sales might be expressed as 20 times inventory. Thus, the ratio is a pure quantity or number, independent of the measurement units being used.

A financial ratio is defined as a *relationship between two variables taken from financial statements of a concern*. It is a mathematical yardstick which measures the relationship between two financial figures. It involves the breakdown of the examined financial report into component parts which are then evaluated in relation to each other and to exogenous standards.

As the ratio represents a relationship between figures, a number of ratios can be formed by taking any two figures from the financial statements. However, such an approach would not fulfill any purpose unless the figures chosen are significantly correlated with each other. Furthermore, many of the ratios tend to deal with different aspects of the same relationship, and there is little point in calculating several ratios in order to investigate the same point. Experts have identified some ratios as significant and important since they throw considerable light on the financial position of a concern.

Interpretation of Ratio

One of the most difficult problems confronting the analyst is the interpretation and analysis of financial ratios. An adequate financial analysis involves more than an understanding and interpretation of each of the individual ratios. Furthermore, the analyst requires an insight into the meaning of inter-relationships among the ratios and financial data in the statements. Gaining such an insight and understanding requires considerable experience in the analysis and interpretation of financial statements. Moreover, even experienced analyst cannot apply their skill equally well to analyse and interpret the financial statements of different organizations. The characteristics may differ from industry to industry and from firm to firm within the same industry. A ratio that is high for one firm at one time may be low for another firm or for the same firm at a different time. Therefore, the analyst must be familiar with the characteristics of the firm of which he is interpreting the final ratios.

The analyst must not undertake the interpretation and analysis of financial ratios in isolation from other information. The following factors must be considered while analysing the financial ratios:

- General economic condition of the firm

- Risk acceptance
- Future expectations
- Future opportunities
- Accounting system of the industry
- Analysing and interpretation system used by other firms in the industry.

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The analysis and interpretation of financial ratios in the light of the above-listed factors can be useful but the analyst must still rely on skill, insight, and even intention in order to interpret the ratios and arrive at a decision. The interpretation of the ratios can be made by comparing them with:

- *Previous figures* – trend analysis;
- *Similar firms* – inter-firm comparisons;
- *Targets* – individual ratio set to meet the objective.
- ***Trend Analysis*** The analyst usually use historical standards for evaluating the performance of the firm. The historical standards represent the financial ratios computed over a period of time which sets the trend. Trend analysis provides enough clues to the analyst for proper evaluation of the financial ratios. However, the changes in firm's policies over the period must be considered while interpreting ratios from comparison over time. Further, the average of the ratios for several years can also be used for this purpose.
- ***Inter-firm Comparisons*** Inter-firm comparisons may advocate the comparisons of similar ratios for a number of different firms in the same industry. Such an attempt would facilitate the comparative study of financial position and performance of the firms in the industry. The published ratios of trade associations or financial institutions can be of great help to the analyst in interpreting the financial ratios. However, the variations in accounting system and changes in the policies and procedures of the firm in comparison with the industry have to be taken care of while making use of inter-firm comparisons.
- ***Targets*** Under this method, the interpretation of the ratio is made by comparing it with the standard set for this purpose. Such a standard ratio, based upon well-proven conventions serves as a measuring scale for the evaluation of the ratios. The best example of such standard is the 1:1 ratio, which is to be considered as a good ratio for analysing the acid-test ratio.

Generally speaking, the use of single standard ratio for the interpretation of ratios is not much useful. The accounting experts usually recommend the use of groups of standard ratios for the evaluation of financial ratios.

Advantages of Ratio Analysis

Ratio analysis helps the management to identify specific areas that reflect improvement or deterioration, as well as detect the trouble spots that may prevent the attainment of objectives. The interested parties undertake frequent examination of different areas of business to evaluate the management's ability to maintain a satisfactory balance among them, and to appraise the efficiency and effectiveness with which the management directs the firm's operations. Thus, the purpose of ratio analysis is to help the reader of financial statements to understand the information shown by highlighting a number of key relationships. However, the following are the principal advantages claimed by ratio analysis:

- It guides management in formulating future financial planning and policies.
- It throws light on the efficiency of the business organization.
- It permits comparison of the firm's figures with data for similar firms, and possibly with industry-wise data. It also allows the data to be measured against yardsticks of performance or of sound financial condition.
- It ensures effective cost control.
- It provides greater clarity, perspective, or meaning to the data, and it brings out information not otherwise apparent.
- It measures profitability and solvency of a concern.
- It permits monetary figures of many digits to be condensed to two or three digits and therefore enhances managerial efficiency.
- It helps in investment decisions.

Limitations of Ratio Analysis

In using ratios, the analyst must keep a few general limitations in mind. The main limitations attached to it are:

- It lacks standard values for the ratio, therefore, scientific analysis is not possible.
- As there are no standards of comparison, it fails to throw light on the efficiency of any activity of the business.
- It gives only the relationship between different variables and the actual magnitudes are not known through ratios.
- Ratios are derived from financial statements and naturally reflect their drawbacks.
- It fails to indicate immediately where the mistake or error lies.
- It does not take into consideration the market and other changes.

Check Your Progress

1. List the factors which must be considered while analysing the financial ratios.
2. Name the technique of interpretation of ratio in which historical standards are used for evaluating the performance of the firm.

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8.3 CLASSIFICATIONS OF RATIOS

Ratios have been classified by different experts differently based on their peculiar characteristics. Some authorities classify ratios on the basis of the financial statements or statements from which the financial figures are selected. Accordingly, the following classification of ratios can be formed:

- ***Profit and Loss Ratios:*** These ratios indicate the relationship between two such variables which have been taken from the profit and loss account. Basically, there are two types of such ratios, viz., those showing the current year's figures as a percentage of last year, thus facilitating comparison of the changes in the various profit and loss items; and those expressing relationship among different items of the current year, for example, the percentage of distribution expenses to sales.
- ***Balance Sheet Ratios:*** Top management will probably want to view the financial structure of the company in terms of basic ratios of asset or liability categories to total assets. This set of ratios attempts to express the relationship between two balance sheet items, e.g., the ratio of stock to debtors, or the ratio of owner's equity to total equity.
- ***Inter-statement Ratios/Mixed Ratios:*** The components for computation of these ratios are drawn from both balance sheet and profit and loss account. These ratios deal with the relationship between operating and balance sheet items. The examples of such ratios are debtors' turnover ratio, fixed assets turnover ratio, working capital turnover ratio, and stock turnover ratio.

Some authorities classify the ratios on the basis of time to which the ratios computed belong. On this basis, the ratio can be divided into following two major groups:

- ***Structural Ratios:*** Structural ratios exhibit the relation between two such items which relate to the same financial period. Thus, the above-mentioned classification of ratios, *i.e.,* profit and loss ratios, balance sheet ratios and mixed ratios are covered under structural ratios if the components for the computation of these ratios are drawn from the financial statement that relate to the same period.
- ***Trend Ratios:*** These ratios deal with the relationship between items over a period of time. Trend ratios indicate the behaviour of ratios for the period under study and thus provide enough scope for the proper evaluation of the business.

Another classification of ratios as developed by financial experts is on the basis of significance of ratios. Some ratios are considered more important than others when ratios are evaluated in the light of the objectives of the business. Accordingly, the following two main groups of ratios are covered under this classification:

- ***Primary Ratios*** Every commercial concern considers profit as its prime objective, and therefore, any ratio that relates to such objective is treated as a primary ratio. The ratios covered by this category are return on capital, gross margin to sales, etc.
- ***Secondary Ratios*** Ratios other than primary ratios are known as secondary ratios. Such ratios are treated as supporting ratios to the primary ratios because these ratios attempt to explain the primary ratios. Ratios such as turnover ratios, expenses ratios, earnings per share are considered as secondary ratios.

Ratios are also classified according to the financial characteristics they describe. Accordingly, the following classification of ratios is made:

- Liquidity Ratios;
- Leverage Ratios;
- Profitability Ratios; and
- Activity Ratios.

The classification on the basis of characteristics is simple to calculate and easy to understand as compared to other classifications discussed above. Therefore, this classification is always preferred by the financial analyst to evaluate the business performance. Accordingly, a detailed discussion follows on the classification of ratios based on their financial characteristics.

8.3.1 Liquidity Ratios

The liquidity ratios indicate the liquidity of a company. They, in fact, measure the ability of a company to meets its current liabilities as they fall due. If the company has insufficient current assets in relation to its current liabilities, it might be unable to meet its commitments, and be forced into liquidation. Thus, ratios comparing the relationship between various groups of current assets and current liabilities are computed to measure the liquidity position of the company. Such ratios help in ascertaining the effectiveness of the working capital management. To gain an insight, analysts also use the variables other than those covered by the term working capital. The following are the important liquidity ratios:

- ***Current Ratio*** This is a fundamental measure of a firm's financial position in the short run, namely, its ability to meet normal operating obligations during one financial year. The current ratio compares the total current assets with the total current liabilities to find out whether the net assets are sufficient to meet the short-term obligation of the business. It is computed by dividing current assets by current liabilities. Current assets include cash, stock, work-

NOTES

in-progress, marketable securities and accounts receivable. On the other hand, current liabilities include accounts payable, sundry creditors, accrued income taxes, proposed dividend, borrowings from financial institutions and outstanding expenses. Usually current ratio is used by trade creditors to estimate the company's ability to repay its credit. The current ratio is calculated as:

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

A high current ratio indicates a large proportion of current assets are available to meet current liabilities. Usually the higher the ratio, the better is a company's current financial position and normally the better it can meet current obligations. But at the same time, a higher current ratio would also mean that the company may have an excessive investment in current assets that does not produce a significant return. On the other hand, a low current ratio would indicate that sufficient cash is not available to pay current liabilities. A frequently used guideline to evaluate the adequacy of the current ratio is 2:1 or 2. However, there seems to be very little justification for such a standard. For some businesses, this may be an adequate current ratio, for others it may be too high or too low. Therefore, the standard for this ratio will vary from industries to industries. In fact, many renewed companies have much lower current ratio, as low as 1:1. In evaluating the appropriateness of current ratios, much depends on the nature of the business, composition of a firm's current assets, and turnover of the firm's certain current assets.

- ***Acid-test Ratio*** It provides an even more critical look at the ability of the company to meet its day-to-day obligations. It signifies a very short-term liquidity of a business concern and is, therefore, also called '*liquid ratio*'. If it is desired to apply a still stiffer and rigorous test for evaluating a firm's financial position in the short period, the application of acid-test ratio is recommended. The acid-test ratio is computed by dividing current assets in liquid form by current liabilities. Thus, stocks and similar items are excluded from current assets, leaving items such as debtors, bills receivable, marketable securities, and cash, which are already in liquid form, or may easily be converted into cash by discounting or factoring. The acid-test ratio assumes that stock may not be realized immediately and, therefore, this item is excluded in the computation of this ratio. Some experts advocate that the bank overdraft should also be excluded from current liabilities while calculating acid-test ratio. The logic for the exclusion of bank overdraft is based on the fact that bank overdraft is generally a permanent way of financing. The acid-test ratio is expressed as follows:

$$\text{Acid} - \text{Test Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

NOTES

Too low a ratio suggests not only inability to meet current claims but also inability to take advantage of cash discounts and other rewards for prompt payment (such as lower interest rates on borrowings). Further, a company with a low quick ratio may be forced to obtain a short-term loan plus interest charges, or implement some other measures to obtain the required cash. On the other hand, an excessive amount of quick assets could indicate that these assets should be put to more productive or profitable use elsewhere in the enterprise. An acid-test ratio of 1:1 is usually considered ideal and satisfactory. However, this is a rule of thumb and should be applied with care. The advocacy of ratios depends on the industry in which the firm operates.

- ***Receivables Turnover*** Another measure of liquidity is receivable turnover, which indicates the number of times that the average outstanding net receivables is turned over or converted into cash through collections during each year. Receivables turnover is the amount of period required for one complete cycle: From the time receivables are recorded through collection to the time new receivables are recorded. The faster the cycle is completed, the more quickly receivables are converted into cash. When the customers' accounts are collected promptly with little loss or collection expense, the firm finds it easier to meet its obligations when they become due. On the other hand, a long credit period granted to creditors would adversely affect the firms' liquidity position. The receivables turnover is the ratio of sales to net accounts receivable. This ratio is expressed as under:

  Receivable include both debtors and bills receivable and average receivable is calculated as

$$\text{Average Receivables} = \frac{\text{Receivables at the beginning + Receivables at the end}}{2}$$

$$\text{Receivable Turnover} = \frac{\text{Net Sales}}{\text{Average Receivables}}$$

  Some experts believe that the use of beginning and ending balances of receivables to calculate averages fail to give accurate results because year-end balances may not represent account balances most of the time during the year due to seasonal variation in business volume. Therefore, it is advisable to use current year's monthly or quarterly data instead of beginning and ending balances for calculating average receivables.

  It is important to note that while calculating receivables turnover, only credit sales should be used. However, this information often is not available in the financial statements, and therefore, the net sales is used for the purpose.

  Sometimes the receivable turnover is expressed as the 'collection period', viz., how many days (on the average) it takes to collect each rupee due.

NOTES

For the period in question (week, month, quarter, year, etc.), the collection period is calculated as:

$$\text{Average daily sales} = \frac{\text{Total Credit Sales}}{\text{360 (or 365 days)}}$$

The collection period can also be calculated with the help of the following formula:

$$\text{Days's sales in receivable} = \frac{\text{Total Credit Sales}}{\text{Receivable turnover (ratio)}}$$

Note: We use 360 (or 365) day representing a year in the calculation of average daily sales. Such days can be more or less in a financial year depending on number of sundays and holidays which have to be excluded.

$$\text{Day's sales in Receivable} = \frac{\text{Average Receivable}}{\text{Average Daily Sales (Credit)}}$$

A high ratio of receivables to sales suggests over-exposure to credit losses and excessive costs in terms of interest on the capital required to extend credit to customers. Whereas a low ratio suggests insufficient extension of credit and therefore, lost sales and lost profits.

- ***Inventory Turnover*** The liquidity of inventories is measured by the number of times per year that inventory is converted into cost of goods sold. Hence, it is a device to measure the efficiency of the inventory management. However, in its zeal to show a high ratio, inventories are not allowed to drop down below the danger level. This ratio is worked out as under:

$$\text{Inventory Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}}$$

Sometimes it is considered more helpful to express the relationship between inventory and cost of goods sold as the 'number of days' supply of inventory'; in other words, the number of days the inventory supply could last. For the period in question, the number of days' supply of inventory is calculated as:

$$\text{Average day's cost of goods sold} = \frac{\text{Cost of goods sold}}{\text{Number of days in period}}$$

$$\text{Day's supply of Inventory} = \frac{\text{Average Inventory}}{\text{Average day's cost of goods sold}}$$

The average day's supply of inventory can also be computed with the help of the following formula:

$$\text{Day's supply of Inventory} = \frac{\text{Number of days in period}}{\text{Inventory Turnover (Ratio)}}$$

NOTES

Inventory turnover rates vary tremendously by the nature of the business. It is usually desirable to compare a firm's inventory turnover with the turnover experience by comparable companies. It is not unusual for retailers of perishable commodities to experience a higher inventory turnover than those retailers who deal in durable goods. At the other extreme, retailers of jewellery frequently reflect a low yearly inventory turnover. A high turnover compensates for a lower margin on each item, producing a normal profit for the business. On the other hand, a business that sells slow-moving goods must make up for the low turnover by a higher profit margin on each item sold. Of great importance, however, is the need to evaluate the trend in the firm under review. Whether the trend is desirable would require detailed investigation into such aspects as changes in manufacturing techniques, labour slow downs, or inventory stockpiling in anticipation of price increases.

Illustration 8.1: From the following Balance Sheet of Lily Ltd., you are required to calculate the liquidity ratios and give your comments:

Lily Ltd.

Balance Sheet

(*as on 31st Dec., 2012*)

Liabilities	₹	*Assets*	₹
Share Capital:			
60,000 shares @ ₹10 each	6,00,000	Machinery	2,40,000
6% Debentures	2,50,000	Building	2,50,000
Reserves	1,10,000	Furniture and fittings	1,10,000
Bills payable	60,000	Investment (share in XY Co. Ltd.)	1,00,000
Trade creditors	40,000	Inventories	1,20,000
Income tax payable	25,000	Bills receivable	45,000
Outstanding expenses	40,000	Trade debtors	60,000
Bank overdraft	30,000	Short-term investment	65,000
		Cash at bank	1,10,000
		Cash in hand	55,000
	11,55,000		11,55,000

Solution

1. $\text{Current Ratio} = \dfrac{\text{Current Assets}}{\text{Current Liabilities}}$

$$= \frac{1,20,000 + 45,000 + 60,000 + 65,000 + 1,10,000 + 55,000}{60,000 + 40,000 + 25,000 + 40,000 + 30,000}$$

$$= \frac{4,55,000}{1,95,000} = 2.33:1$$

2. $\text{Quick Ratio/Acid-Test Ratio} = \dfrac{\text{Current Assets} - \text{Stock}}{\text{Current Liabilities}} = \dfrac{4,55,000 - 1,20,000}{1,95,000}$

$$= \frac{3,35,000}{1,95,000} = 1.72:1$$

NOTES

Using the traditional guidelines, one would conclude that Lily Ltd. has adequate liquidity. The value of the current ratio indicates that the company has current assets of ₹ 2.33 to pay a current liability of ₹ 1. At the same time, acid-test ratio of the company indicates that for every current liability of ₹ 1 the company has the quick assets of ₹ 1.72. Depending upon the circumstances, this may be enough to assure the liquidity of the company.

Illustration 8.2: M/s Sunlight Ltd. submits the following information for the year ending 31st December 2012:

Sales during the year		
Cash	3,00,000	
Credit	1,60,000	₹ 4,60,000
Stock:		
Opening		₹ 40,000
Closing		₹ 60,000
Gross profit for the year		₹ 1,60,000
Trade debtors:		
1-1-2012		₹ 10,000
31-12-2012		₹ 14,000
Bills receivable:		
1-1-2012		₹ 9,000
31-12-2012		₹ 7,000

You are required to calculate Inventory Turnover and Receivable Turnover ratio from the above given information.

Solution

1. Inventory Turnover Ratio $= \frac{\text{Cost of Goods Sold}}{\text{Average Inventory}} = \frac{₹\,3,00,000}{₹\,50,000}$

   $= 6$ times

2. Receivable Turnover Ratio $= \frac{\text{Net Sales (Credit)}}{\text{Average Receivable}} = \frac{₹\,1,60,000}{₹\,20,000}$

   $= 8$ times

Workings:

1. Cost of goods sold = Sales – Gross Profit

   = ₹ 4,60,000 – ₹ 1,60,000

   = ₹ 3,00,000

2. Average Inventory $= \frac{₹\,40,000 + 60,000}{2}$

   = ₹ 50,000

3. Average Receivable* $= \frac{₹\,19,000 + 21,000}{2}$

   $= \frac{₹\,40,000}{1}$

   = ₹ 20,000

8.3.2 Solvency Ratios (or Leverage Ratio)

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Leverage is a reflection of the use of borrowed funds by a company to increase the return on owner's equity. Leverage ratios measure the contribution of financing by owners compared with financing provided by the firm's creditors. As the liquidity test measures the ability of a firm to meet its current financial obligations, leverage ratios, which gauge a firm's solvency, attempt to monitor the ability of a firm to pay all of its debts—current as well as non-current, as they become due. The capital structure of almost every company consists of two major components, viz.,

- Equity capital—capital that belongs to owners-investors
- Debt capital—amount that belongs to creditors

The proportion of debt capital to the total capital of a firm is usually referred to as '*leverage*' or *trading on the equity*. The fundamental economic principle underlying leverage is that whenever funds are borrowed at a lower rate of interest than the borrower can earn on those funds, the rate of return of owner's equity is increased over what it otherwise would have been had the borrowed funds been provided by the owners (Hobbs and Moore, 1979). Borrowing too heavily, however, can invite financial difficulty primarily because interest payments and principal repayments are contractual obligations that must be honoured. The ability to obtain and to repay a long-term debt often depends on a firm's ability to obtain capital from shareholders. Therefore, the relationship between shareholders' equity and creditors' equity is evaluated. The leverage ratios commonly used are discussed below.

- ***Debt–Equity Ratio*** It develops the relationship between owned funds and the borrowed funds. This reflects the extent to which borrowed capital is used in place of equity capital. Business firms acquire assets both with owners' and creditors' funds. The larger the portion of funds provided by owners, the less risk is assumed by creditors. The debt-equity ratio is worked out as:

$$\text{Debt-Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Owners' Equity}}$$

  The ratio represents the proportion of external equity to internal equity in the capital structure of the firm. The external equity represents the amount of debts/liabilities to outsiders. It includes both short-term as well as long-term liabilities. On the other hand, owners equity includes all such liabilities that belong to the shareholders, e.g., share capital (both preferential as well as equity), reserves and surpluses. However, the accumulated losses and deferred expenses are to be deducted from the owner's equity in the calculation of debt–equity ratio.

  Either too high or too low a ratio may be disadvantageous. Too high suggests that management is not taking advantages of opportunities to maximize profits

NOTES

through borrowing. Too low suggests undue exposure to risks of bankruptcy and to a fixed burden of interest expenses in the event of a period of relatively low profit (when the rate of return on total capital is less than the interest rate on borrowed capital). As a rule of thumb, debt–equity ratio of less than 2:1 is taken as acceptable, but this is not based on any scientific analysis. However, many financial analysts prefer to consider 1:1 as safe. As the ratio increases, the amount of risk assumed by creditors increases, because the ratio indicates decreasing solvency. In fact, the acceptable level of ratio will vary from firm to firm. For example, banking institutions will have much higher debt–equity ratio as compared to manufacturing or trading concerns.

- ***Equity Ratio/Proprietary Ratio*** A variant to the debt–equity ratio is the proprietary ratio which indicates the relationship between owner's equity and total assets. It measures the proportion of a company's assets that are provided or claimed by the owners. The ratio of owners' equity to total assets is a measure of the financial strength or weakness of the enterprise. Recall that the owners' equity is the residual interest in a firm's assets after allowance has been made for the claims of creditors against the assets. If the owners' equity is a small proportion of the total assets, the enterprise may be considered financially weak, because the owners have a relatively small investment in the firm as compared to the creditors. On the other hand, a low proprietary ratio would indicate a relatively larger degree of security for the company. This ratio is worked out as follows:

$$\text{Equity Ratio} = \frac{\text{Owners' Equity}}{\text{Total Assets}}$$

  The components of the proprietary ratio are owners' equity and total assets. The owners' equity includes share capital both preferential and equity, undistributed profits, reserves and surplus. The amount of owners' equity must be deducted by the amount of accumulated loss, if any. On the other hand, the total assets represent the total resources of the company. However, some experts are of the opinion that the total assets of a company for the purpose of proprietary ratio should include only tangible assets. Consequently, the amount of goodwill shall be excluded from the total assets in the computation of owners' equity to total assets.

- ***Ratio of External Equities to Total Assets (Solvency Ratio)*** This is a variant of the proprietary ratio. This ratio measures the proportion of a firm's assets that are financed by creditors. To the creditor, a low ratio would ensure greater security for extending credit to the firm. However, a too low ratio suggests that management is not using its credit most advantageously. This ratio is expressed as under:

$$\text{Solvency Ratio} = \frac{\text{External Equity}}{\text{Total Assests}}$$

The term external equities represent all debts, both long-term as well as short-term. On the other hand, total assets refer to total resources of the concern.

- ***Fixed Assets to Net Worth Ratio (Ratio of Fixed Assets to Proprietor's Funds)***

  This ratio indicates the percentage contributed by owners to the value of fixed assets. It can be worked out as follows:

$$\text{Fixed Assests to Net Worth} = \frac{\text{Fixed Assets}}{\text{Net Worth}}$$

  Fixed assets represent cost of acquisition of the fixed assets deducted by the amount of depreciation thereon up to the period. The net worth represents the amount due to the shareholders, *i.e.,* share capital, reserves and surpluses. Financial experts are of the opinion that in manufacturing concerns, investment in plants should be made out of equity rather than borrowed capital, therefore, a ratio of at least 1:1 is considered desirable. On the other hand, a lower ratio suggests an undue burden of debt on the enterprise that tends to increase the internal rate at which an enterprise can borrow.

- ***Current Assets to Net Worth Ratio*** This ratio signifies the relationship between the current assets and net worth. In other words, it is a correlation between current assets and net worth. We can put this as under:

$$\text{Current Assets to Net Worth Ratio} = \frac{\text{Current Assets}}{\text{Net Worth}}$$

  This ratio indicates the extent to which shareholders' funds have gone into the financing of the current assets. It is advisable to study the ratio of current assets to net worth with the ratio of fixed assets to net worth.

- ***Interest Coverage Ratio*** A company is considered solvent if its revenue is more than its interest and other expenses. Consequently, the company that has revenue sufficient to meet only the expenses and leaving nothing as net income is considered less solvent. Against this background, one of the approaches to test solvency of the enterprise is interest coverage ratio. This ratio measures how many times a company could pay its interest expenses. This ratio is calculated by dividing interest expenses into earnings available for payment of interest expense. We can put this as under:

$$\text{Interest Coverage Ratio} = \frac{\text{Net Profit before Interest and Tax}}{\text{Fixed Interest Charges}}$$

  Interest coverage ratio measures the ability of a firm to protect the interests of long-term creditors. It is often stated that in order to ensure adequate protection to long-term creditors, this ratio should be 2 or more.

NOTES

Illustration 8.3: From the following balance sheet you are required to calculate leverage ratios:

Balance Sheet

Liabilities	₹	*Assets*	(₹)
3,000 Equity shares @ ₹ 100 each	3,00,000	Building	2,50,000
7% Debentures	1,50,000	Furniture	40,000
Reserves and Surplus	80,000	Machinery	2,10,000
Sundry creditors	30,000	Stock	60,000
Bills payable	50,000	Debtors	30,000
		Cash balances	20,000
	6,10,000		6,10,000

Solution

$$\text{Debt-Equity Ratio} = \frac{\text{Total Debt}}{\text{Total Owner's Equity}} = \frac{₹\ 2,30,000}{₹\ 3,80,000}$$
$$= 0.61 \text{ (approx.)}$$

$$\text{Equity Ratio} = \frac{\text{Owner's Equity}}{\text{Total Assets}} = \frac{₹\ 3,80,000}{₹\ 6,10,000}$$
$$= 0.62 \text{ (approx.)}$$

$$\text{External Equitites to Total Assets Ratio} = \frac{\text{External Equity}}{\text{Total Assets}}$$
$$= \frac{₹\ 2,30,000}{₹\ 6,10,000}$$
$$= 0.38 \text{ (approx.)}$$

$$\text{Fixed Assets to Net Worth Ratio} = \frac{\text{Fixed Assets}}{\text{Net Worth}}$$
$$= \frac{₹\ 5,00,000}{₹\ 3,80,000} = 1.32 \text{ (approx.)}$$

$$\text{Current Assets to Net Worth Ratio} = \frac{\text{Current Assets}}{\text{Net Worth}}$$
$$= \frac{₹\ 1,10,000}{₹\ 3,80,000}$$
$$= 0.29 \text{ (approx.)}$$

8.3.3 Profitability Ratios

Profit has always been considered as the main indicator of a successful business. However, the real test of success or failure of a business is to evaluate its profit-earning capacity in relation to capital employed. It is against this background that financial experts developed profitability ratios which are used to measure the ability of the firm to convert sales into profits and to earn profits on assets employed. These indicate degree of success in achieving profit levels. The following are important profitability ratios:

- ***Gross Profit Margin Ratio*** This ratio indicates the relationship between gross profit and sales. It reflects how well cost of goods sold, a major

NOTES

expense item, is being controlled. It shows the profit made on sales before taking account of overheads. Thus, the gross profit margin highlights the production efficiency of a concern. It is always preferred to express this ratio in terms of percentage. The gross profit margin is computed by deducting cost of goods sold from the amount of sales as shown below:

$$\text{Gross Profit Margin Ratio} = \frac{\text{Sales} - \text{Cost of Goods Sold}}{\text{Sales}} \times 100$$

$$= \frac{\text{Gross Operating Profit}}{\text{Sales}} \times 100$$

In interpreting the gross profit margin ratio, it is important to observe any trend, but in making comparisons between companies it is vital to appreciate that gross profit margins vary considerably from industry to industry. However, gross profit margin must be sufficient to meet administrative and distribution expenses, dividend and accumulation of reserves.

- ***Net Profit Margin Ratio*** It monitors the net profit made in relation to sales. This ratio, also known as net operating margin, is calculated by dividing the net profit after tax by the amount of sales. Thus, net profit margins ratio can be written as under:

$$\text{Net Profit Margin Ratio} = \frac{\text{Net Profit after Tax}}{\text{Sales}}$$

In interpreting the net profit margin ratio it is important to bear in mind that such ratios vary considerably from firm to firm. Firms engaged in retailing are likely to have quite rapid turnover and to operate on low margins allied to high volume, while those firms engaged in selling a few large items must make a high profit in relation to the sales value of each one.

The net profit margin ratio provides a relatively clear picture of how efficiently the firm maintains control over its total expenses. In addition, the analyst may wish to calculate the relationship between each expense item and sales to determine the extent to which specific expenses are under control or are tending to move out of control. For this purpose, expenses ratios are used. Expenses ratios monitor the various expenses incurred in relation to sales. A high expense ratio would indicate low profitability while a low ratio is an indication for higher profitability. This ratio can be worked out as under:

$$\text{Particular Expenses Ratio} = \frac{\text{Particular Expenses}}{\text{Sales}} \times 100$$

- ***Return on Assets/Capital Employed*** One of the most widely used ratios is the return on assets.

Since assets are used to generate income, the higher the income, the more productive assets were during the period. In computing the return on assets, the analyst must bear in mind that both borrowed as well as owned funds

NOTES

are used by the business for the acquisition of assets, therefore, the return on assets should be computed before accounting for the interest on borrowed capital. At the same time, income tax too is not considered while calculating this ratio because taxes are calculated on income after interest deductions. Consequently, earning (income) before interest and taxes is usually used to measure the return on assets. Thus,

$$\text{Return on Assets} = \frac{\text{Earnings before Interest and Taxes (EBIT)}}{\text{Average Assets *}} \times 100$$

In the computation of average assets, the fictious assets must be excluded

When details about interest and tax are not available from financial statements, the analyst may replace earnings before interest and tax by net income in the calculation of the return on total assets.

- ***Return on Owners' Equity*** Though the ratio of net profit to sales is a very useful indicator of performance in comparison to the company's experience in prior periods or to the current experience of other companies, it does not give a direct answer to a vital question: is the business providing an adequate return on the owners' investment, taking into account the risk associated with the company's business and what could be the earnings of this investment in alternative ventures? To help answer this question, the ratio of return on owners' equity is needed. The profit earned by the owners of a business is called *return on owners' equity*. This ratio is considered as an effective indicator of a company's profitability because it reflects the management's success in efficient utilization of the owners' investment. The return on owners' equity is worked out with the help of the following formula:

$$\text{Return on Owners' Equity} = \frac{\text{Net Profit after Taxes}}{\text{Owner's Equity}} \times 100$$

- ***Return on Equity Capital*** Equity shareholders are more serious as compared to preference shareholders in the profitability of a company. It is perhaps so because equity shareholders assume the highest risk in the company. Preference shareholders are assured of the rate of dividend, and therefore, the profitability of the company has no meaning for them. On the other hand, the rate of dividend for equity shareholders largely depends on the availability of profits. With the result, return on equity capital is a useful indicator for equity shareholders to measure the performance of the company. Return on equity capital monitors the profit made by the company in relation to its equity capital. This ratio is worked out as under:

$$\text{Return on Equity Capital} = \frac{\text{Net Profits after Tax} - \text{Preference Dividend}}{\text{Equity Share Capital}} \times 100$$

- ***Earnings Per Share (EPS)*** This is a well known and widely used indicator of profitability because it can easily be compared to the previous EPS figure

NOTES

and to the EPS figure of other companies. The earnings per share represent average amount of net income earned by single equity share. This is calculated with the help of the following formula:

$$\text{EPS} = \frac{\text{Net Profit after Tax} - \text{Preference Dividend}}{\text{Number of Equity Shares}}$$

Illustration 8.4: The following are the summarised profit and loss account of Sweety Ltd. for the year ended 31st March, 2011:

Profit and Loss Account

Particulars	₹	*Particulars*	₹
To Opening stock	2,20,000	By Sales	9,00,000
To Purchases	6,00,000	By Closing stock	3,00,000
To Wages	1,60,000		
To Gross profit c/d	2,20,000		
	12,00,000		12,00,000

Particulars	₹	*Particulars*	₹
To Administrative expenses	40,000	By Gross profit b/d	2,20,000
To Selling and distribution expenses	45,000	By Interest (from investment outside business)	40,000
To Non-operating expenses	40,000	By Profit on sale of investment	40,000
To Net profit	1,75,000		
	3,00,000		3,00,000

Assume the rate of tax as 40 per cent

You are required to calculate:

(i) Gross Profit Margin Ratio

(ii) Net Profit Margin Ratio

(iii) Selling and Distribution Expenses Ratio.

Solution

$$\text{Gross Profit Margin Ratio} = \frac{\text{Gross Profit}}{\text{Sales}} \times 100$$

$$= \frac{₹\ 2,20,000}{₹\ 9,00,000} \times 100 = 24.4\%$$

$$\text{Net Profit Margin Ratio} = \frac{\text{Net Profit after Tax}}{\text{Sales}} \times 100$$

$$= \frac{1,05,000}{9,00,000} \times 100$$

$$= 11.66\%$$

$$\text{Selling and Distribution Expenses} = \frac{\text{Selling and Distribution Expenses}}{\text{Sales}} \times 100$$

$$= \frac{45,000}{9,00,000} \times 100$$

$$= 5 \text{ per cent}$$

NOTES

Working Notes:

Calculation of profits after tax:

	₹
Profit as per P&L A/c	1,75,000
Less: Tax @ 40%	70,000
Profit after tax	1,05,000

Illustration 8.5: On the basis of information given in Illustration 9.4 and the information given below, you are required to calculate the following ratios:

(i) Return on Assets

(ii) Return on Equity Capital

(iii) Return on Owner's Equity

(iv) Earnings Per Share.

Additional Information:

Capital:

5,000, 7% preference shares @ 100 each fully paid: 15,000 equity shares @ 100 each fully paid Assets:

1 - 4 - 2010 ₹ 5,50,000

31 - 3 - 2011 ₹ 7,00,000

Solution

$$\text{Return on Assets} = \frac{\text{Earnings before Interest and Taxes (EBIT)}}{\text{Average Assets}} \times 100$$

$$= \frac{₹\ 1,75,000}{₹\ 6,25,000} \times 100$$

$$= 28 \text{ per cent}$$

$$\text{Return on Owners Equity} = \frac{\text{Net Profit after Tax}}{\text{Owners' Equity}} \times 100$$

$$= \frac{₹\ 1,05,000}{₹\ 20,00,000} \times 100$$

$$= 5.25 \text{ per cent}$$

$$\text{Return on Equity Capital} = \frac{\text{Net Profit after Tax} - \text{Pref. Dividends}}{\text{Equity Share Capital}} \times 100$$

$$= \frac{₹\ 1,05,000 - ₹\ 35,000}{₹\ 15,00,000} \times 100$$

$$= 4.67 \text{ per cent}$$

$$\text{Earnings per Share} = \frac{\text{Net Profits after Tax} - \text{Pref. Dividends}}{\text{No. of Equity Shares}}$$

$$= \frac{₹\ 1,05,000 - ₹\ 35,000}{15,000}$$

$$= \frac{₹\ 70,000}{15,000} = ₹\ 4.67$$

Working Notes:

Calculation of Preferential Dividend:

= 7/100 × 5,00,000 = ₹ 35,000

NOTES

Calculation of Average Assets:

$$\frac{\text{Operating Balance} + \text{Closing Balance}}{2}$$

$$= \frac{₹\ 5,50,000 + ₹\ 7,00,000}{2}$$

= ₹ 6,25,000

8.3.4 Activity Ratios

Activity ratios measure the efficiency of a firm in utilizing the available resources. Such ratios reflect the success of a firm in utilizing its resources in business activities. Activity ratios are popularly known as *turnover ratios* because they highlight the ability of management to convert or turnover the assets of the firm into sales. These ratios make a comparative study of the level of sales and the investment in various assets accounts. A sharp rise in this ratio may indicate that the company is expanding too quickly and is allowing sales to increase more rapidly than the underlying asset-base, a situation often referred to as 'over trading'. Conversely, a reduction in the ratio can indicate a decline in efficiency or a fall in demand for a firm's products. The important activity ratios are mentioned below:

- Fixed assets turnover
- Total assets turnover
- Inventory turnover
- Average collection period

The last two ratios of the above-mentioned activity ratios have already been discussed under liquidity ratio in the earlier section of this unit.

- ***Fixed Assets Turnover*** The ratio measures the efficiency in the utilization of fixed assets. The ratio of sales to fixed assets measures the turnover of the plant and machinery and is expressed as under:

$$\text{Fixed Assets Turnover} = \frac{\text{Sales}}{\text{Net Fixed Assets}}$$

- ***Total Assets Turnover*** This ratio measures the overall performance and activity of the business organization. It is computed by dividing sales by total assets. The following formula is applied to compute this ratio:

$$\text{Total Assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

NOTES

Illustration 8.6: Compute the Fixed Assets Turnover and Total Assets Turnover from the following particulars:

Sales		₹ 3,00,000
Sales Return		₹ 40,000
Assets:		
Fixed	2,00,000	
Curent	1,50,000	₹ 3,50,000

Solution

$$\text{Fixed Assets Turnover} = \frac{\text{Sales}}{\text{Fixed Assets}}$$

$$= \frac{₹\ 2,60,000}{₹\ 2,00,000}$$

$$= 1.3:1$$

$$\text{Total Assets Turnover} = \frac{\text{Sales}}{\text{Total Assets}}$$

$$= \frac{₹\ 2,60,000}{₹\ 3,50,000}$$

$$= 0.74:1$$

Check Your Progress

3. Give some examples of secondary ratios.
4. How is acid-test ratio calculated?
5. What does interest coverage ratio measure?
6. Which type of earnings are used to measure the return on assets?

8.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The factors which must be considered while analysing the financial ratios include general economic condition of the firm, risk acceptance, future expectations, future opportunities, accounting system of the industry and analysing and interpretations system used by other firms in the industry.
2. Trend analysis is the technique of interpretation of ratio in which historical standards are used for evaluating the performance of the firm.
3. Turnover ratios, expenses ratios, earnings per share are some examples of secondary ratios.
4. Acid-test ratio is calculated by dividing current assets in liquid form by current liabilities.
5. Interest coverage ratio measures the ability of a firm to protect the interests of long-term creditors.
6. Earnings (income) before interest and taxes are usually used to measure the return on assets.

8.5 SUMMARY

NOTES

- Ratio analysis is one of the popular tools of financial statement analysis.
- A ratio is defined as the indicated quotient of two mathematical expressions and therefore expresses the relationship between two or more things.
- Financial ratio expedites the analysis by reducing the large number of items involved to a relatively small set of readily comprehended and economically meaningful indicators.
- The trend analysis provides enough clues to the analyst for proper evaluation of the financial ratios.
- Inter-firm comparisons may claim the comparisons of similar ratios for a number of different firms in the same industry.
- Profit and loss ratios indicate the relationship between two such variables which have been taken from the profit and loss account.
- Balance sheet ratios attempts to express the relationship between two balance sheet items e.g., the ratio of stock to debtors, or the ratio of owner's equity to total equity.
- Inter-statement ratios deal with the relationship between operating and balance sheet items.
- Structural ratios exhibit the relation between two such items which relate to the same financial period.
- Trend ratios deal with the relationship between items over a period of time.
- Primary ratios refer to any ratio that relates to such objective is treated as primary ratio.
- Secondary ratios represent such ratios other than the primary ratio.
- The liquidity ratios indicate the liquidity position of a company.
- Leverage ratios measure the contribution of financing by owners compared with financing provided by the firm's creditors.
- Profitability ratios are used to measure the ability of the firm to convert sales into profits and to earn profits on assets employed.
- Activity ratios measure the efficiency of a firm in employing the available resources.

8.6 KEY WORDS

- **Financial ratio:** It refers to a relationship between two variables taken from financial statements of a concern.

- **Liquidity ratios:** It refers to the ratios comparing the relationship between various groups of current assets and current liabilities to measure the liquidity position of the company.
- **Solvency ratios:** It refers to the ratios which measure the contribution of financing by owners compared with financing provided by the firm's creditors.
- **Profitability ratios:** It refers to the ratios which measure the profit-earning capacity of a firm in relation to the capital employed.
- **Activity ratios:** It refers to the ratios which measure the efficiency of a firm in utilizing the available resources.

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8.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short-Answer Questions

1. What do you understand by Accounting Ratios? How does the ratio analysis technique help in the financial analysis?
2. What does the rate of return on assets employed tell about management?
3. 'A device for making financial data more meaningful is to reduce them to ratios'. Explain briefly.
4. Discuss the uses and limitation of Accounting Ratios.
5. What do you understand by Liquidity Ratio, Leverage Ratio, Profitability Ratio and Activity Ratio?

Long-Answer Questions

1. Discuss the importance of Ratio Analysis for inter-firm and intra-firm comparisons, including circumstances responsible for its limitation, if any.
2. Describe the various profitability ratios. How are they worked out?
3. State the significance of each of the following ratios and turnovers and tell how each is calculated:
   (i) Current Ratio
   (ii) Receivable Turnover
   (iii) Solvency Ratio
   (iv) Inventory Turnover
   (v) Return on Assets
4. Discuss the usefulness of the following ratios:
   (a) Acid-Test Ratio
   (b) Debt-Equity Ratio

(c) Net Worth to Fixed Assets

(d) Inventory Turnover.

5. The following is the balance sheet of SHE Ltd. as on 31st December, 2012:

NOTES

	₹
Liabilities	
Share capital	2,00,000
General reserve	50,000
Profit and loss	30,500
Bank loan	70,000
Sundry creditors	1,50,000
Provision for tax	30,000
	5,30,500
Assets	
Buildings	2,00,000
Machinery	1,50,000
Inventory	1,00,000
Sundry debtors	60,000
Cash in hand	20,500
	5,30,500

You are required to comment on the liquidity position of the concern.

6. Following accounting information is obtained relating to a limited company:

	₹
Sales	45,00,000
Cost of goods sold	25,00,000
	20,00,000
Administrative expenses	7,00,000
	13,00,000
Taxes	8,00,000
Net profit	5,00,000

Balance Sheet

Liabilities	₹	*Assets*	₹
7% Pref. share capital	30,00,000	Building	30,00,000
Equity share capital	15,00,000	Machinery	25,00,000
Reserves	5,00,000	Debtors	3,00,000
6% Debentures	8,00,000	Stock	3,00,000
Current liabilities	6,00,000	Goodwill	1,00,000
		Cash	2,00,000
	64,00,000		64,00,000

Opening stock was ₹ 3,00,000. Assume 360 days in a year. Compute the following ratios:

(i) Current ratio

(ii) Debtors ratio
(iii) Gross profit ratio
(iv) Net profit ratio.

NOTES

7. The following information is given:

Current ratio	=	2.8
Acid-test ratio	=	1.5
Net current assets	=	1,62,000

Find out:
(a) Current assets
(b) Current liabilities
(c) Liquid assets.

8. (a) Find out current liabilities when current assets are ₹ 6,00,000, current ratio 2.5:1
(b) Find out quick ratio when:

Current assets	=	₹ 2,40,000
Current liabilities	=	₹ 1,60,000
Stock	=	₹ 80,000

8.8 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

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BLOCK - III
WORKING CAPITAL MANAGEMENT, FUND AND CASH FLOW STATEMENT

UNIT 9 WORKING CAPITAL MANAGEMENT

Structure

9.0 INTRODUCTION

Organizations require financing for two purposes: (i) for their establishment and (ii) for carrying out their day-to-day operations. Working capital can be defined as that part of a business's capital that is required for the financing of current or short-term assets. The structure of working capital is involved with the issues that come up while managing current assets, current liabilities and the interrelationships that exist between them.

'Current assets' are those assets that in the regular course of business can, or will, be changed into cash within a year's time. This is done without any decrease in value and without disruption in the operations of the firm, say, cash in hand and bank balances, bills receivables, sundry debtors, short-term loans and advances, inventories of stocks—raw materials, work-in-progress, stores and spares, finished goods, prepaid expenses and accrued incomes.

'Current liabilities' are those liabilities that are aimed, at their inception, to be paid in the ordinary course of business, within a year's time. These are paid out of the current assets or earnings of the firm, say, bills payable, sundry creditors, accrued outstanding expenses, short-term loans, advances and deposits, dividend payable, bank overdraft and provision for taxation.

In this unit, you will be able to the meaning of working capital, the kinds, sources and objectives of working capital management along with determinants of requirements as well as the estimation of working capital requirements.

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9.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning of working capital
- Describe the kinds and sources of working capital
- Discuss the objectives of working capital management
- Examine the determinants of working capital requirement
- Explain the estimation of working capital requirement

9.2 OVERVIEW OF WORKING CAPITAL

Working capital is a very critical financial tool in the hands of organizations. It lays firm foundations for making the operations of a firm profitable and viable.

9.2.1 Meaning of Working Capital

According to author Shubin, 'Working capital is the amount of funds necessary to cover the cost of operating the enterprise'. It is that part of firm's capital which is invested in current assets. It is called circulating capital because of its continuous conversion process. According to C.W. Gerestenberg, 'Circulating capital means current assets of a company that are changed in the ordinary course of business from one form to another, as for example, from cash to inventories, inventories to receivables, receivables into cash'.

Operating Cycle

Investing in working capital is governed by the following main events in a firm's production and sales cycle:

- Raw materials: purchase and payment
- Finished goods: sale to the final customer
- Sales: cash collection

A firm commences its operations by purchasing raw materials that are paid for after a gap in time, also known as the accounts payable period. The firm converts the raw materials to finished goods and then sells it to the customer. Inventory period is the time difference between the purchase of raw materials and the sale of finished goods. Sometimes, customers pay for the goods after the sales. The accounts payable period, also known as the debtors period, is the time that lies between the date of the sale of the goods and the date of collection of receivables.

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Operating cycle is the time that lies between the purchase of raw materials and the collection of cash for sales, while cash cycle is the time between the payment for purchase of raw material and collection of cash for sales. Operating cycle is the sum of the inventory period and the accounts receivable period, while cash cycle is the difference between operating cycle and accounts payable period.

$$\text{Inventory Period} = \left(\frac{\text{Average Inventory}}{\text{Annual Cost of Sold Goods}}\right)\Big/365$$

$$\text{Accounts Receivable Period} = \left(\frac{\text{Average Accounts Receivable}}{\text{Annual Sales}}\right)\Big/365$$

$$\text{Accounts Payable Period} = \left(\frac{\text{Average Accounts Payable}}{\text{Annual Cost of Goods Sold}}\right)\Big/365$$

Based on a firm's financial statements, the following items can be estimated: inventory, accounts receivable and accounts payable periods.

9.2.2 Kinds of Working Capital

Working capital can be classified on the basis of concept and time.

Classification of working capital on the basis of concept

There are two concepts of working capital, **gross** and **net.**

(i) The term ‘Gross Working Capital’ (GWC) can also be referred to as ‘working capital’ which means the total of current assets.

(ii) The term ‘Net Working Capital’ (NWC) can be defined in two ways:

  (a) The most common definition of NWC is the difference between current assets and current liabilities.

  (b) The alternate definition of NWC is provided by Gitman as ‘that portion of a firm’s current assets which are financed with long-term funds’.

NWC can be positive or negative. When current assets are more than current liabilities, a positive net working capital occurs. When current liabilities are more than current assets, a negative net working capital occurs.

GWC and its implications: The two concepts of working capital: gross and net, are not exclusive, rather they have equal significance from management viewpoint. The concept of gross working capital (GWC) focuses attention on two aspects of current assets management:

(a) Optimum investment in current assets, and

(b) Financing of current assets.

The consideration of the level of investment in current assets should avoid two danger points: **excessive** and **inadequate** investment in current assets. The investment in current assets should be just adequate, not more nor less, to the needs of the business firm. It should be realized that the working capital needs of

the firm may fluctuate with the changing business activity. This may cause frequent excess or shortage of working capital. The management should be prompt in initiating actions and correcting the imbalances.

Another aspect of GWC is financing of current assets. Whenever a need for working capital fund arises due to the increasing level of business activity or for any other business reason the arrangement should be made quickly. Similarly, if a surplus fund suddenly comes up, it should not be allowed to remain idle but should be invested in short-term securities. Therefore, the financial manager should have knowledge of the sources of working capital funds as well as the investment avenues where the idle funds may be temporarily invested.

GWC is based on financial or going concern concept, whereas the NWC is based on accounting concept.

The 'gross concept' has the following advantages:

- It lets the firm provide accurate working capital at the right time.
- It is useful in calculating the rate of return on investments in working capital.
- The management is concerned about the total current assets with which it has to operate.
- Increase in current assets inevitably leads to an increase in working capital.

NWC and its implications

From the management viewpoint, GWC deals with the problems of managing individual current assets in the day-to-day operations. But for having a long-run view of working capital, we have to concentrate on the net value of current assets, i.e., the operation of current assets which is constant in short-run analysis and decision-making but variable and manageable in long-run operations. NWC is commonly defined as the difference between current assets and current liabilities. Efficient working capital management requires that firms should operate with some amount of NWC, the exact amount varying from firm-to-firm and depending, among other things, on the nature of industry.

The theoretical justification for the use of NWC to measure a firm's liquidity is based on the premise that the greater the margin by which the current assets cover the short-term obligations, the more able they will be to pay their obligations when they become due for payment. NWC is necessary because the cash outflows and inflows do not coincide. In other words, it is the non-synchronous nature of cash flows that makes NWC necessary. In general, the cash outflows resulting from payment of current liabilities are relatively predictable. The cash inflows are, however, difficult to predict. The more predictable the cash inflows are the less NWC will be required. But where cash inflows are uncertain, it will be necessary to maintain current assets at a level adequate to cover their current liabilities, i.e., there must be NWC.

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NWC can also be put as that portion of the current assets that are financed with the use of long-term funds. It must be known that current liabilities stand for sources of short-term funds, and as long as current assets are in excess of current liabilities, long-term funds must be used to finance the excess. This alternate definition is more useful for the analysis of the trade-off between profitability and risk.

The net value concept is preferred for the following reasons:

1. It enables and shows the firm's ability to meet the operating expenses and short-term liabilities.
2. It indicates the margin of protection available to the short-term creditors.
3. It is an indicator of the firm's short-term solvency.
4. It suggests the need for financing part of working capital out of permanent funds of the enterprise.

Classification of working capital on the basis of time

Working capital can also be studied under two heads:

(*i*) Fixed, regular, or permanent

(*ii*) Variable, seasonal, or special

Fixed, regular or permanent working capital: A part of the investment in current assets is as permanent as the investment in fixed assets. It covers irreducible minimum amount necessary for maintaining the circulation of the current assets. Working capital invested in starting the circulation of the current assets and for keeping it moving is permanently locked up. For instance, every industrial enterprise has to maintain a minimum stock of raw materials, work-in-progress, finished products, loose tools and spare parts. It requires money for the payment of wages and salaries throughout the year. As the business grows, this amount also increases. A part of this amount is regularly invested in marketable securities to meet unforeseen situations such as rise in prices, strikes, depressions, etc.

Variable, seasonal, special or temporary working capital: Variable working capital is the amount which is required to meet the seasonal demands and special exigencies. Seasonal demands relate to increase in demand for goods for which earlier production and stocking is necessary. Special exigencies may relate to launching of special marketing campaign or starting research activity. More money may be required to tide over the dull market conditions because finished goods remain in stock on account of crash in the prices. Additional doses of working capital may be administered to face cut-throat competition or other contingencies like lockouts. Execution of special orders of the government may have to be financed by additional working capital.

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The distinction between regular and variable working capital is important in arranging the finance for an enterprise. It is undesirable to bring regular working capital into business on a short-term basis because a creditor can seriously handicap the business by refusing to continue lending. The distinction between permanent and temporary working capital is illustrated in Figure 9.1.

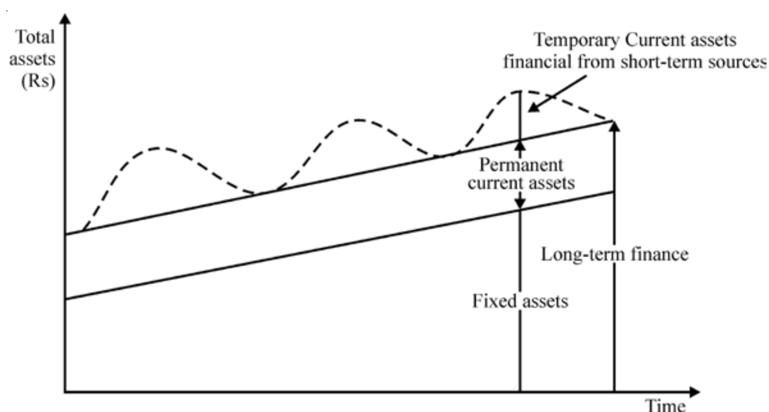


Fig. 9.1 *Permanent and Temporary Working Capital*

Figure 1.1 shows that the permanent level is fairly constant, while temporary working capital is fluctuating – sometimes increasing and sometimes decreasing in accordance with seasonal demands. In the case of expanding firms, the permanent working line may not be horizontal. This is because the demand for permanent current assets might be increasing (or decreasing) to support a rising (or declining) level of activity. In that case, the line would be as shown in Figure 9.2.

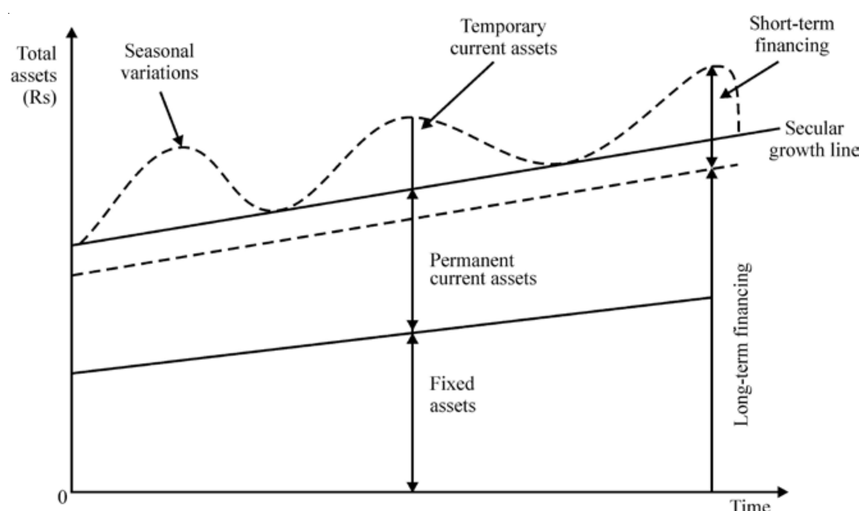


Fig. 9.2 *Permanent and Temporary Working Capital in Expanding Firms*

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Both kinds of working capital are necessary to facilitate the sales process through the operating cycle. Temporary working capital is created to meet liquidity requirements that are purely transient in nature.

9.2.3 Objectives of Working Capital Management

Working capital is needed because of the time gap between production of goods and realization of cash from sales. An operating cycle that exists and is involved in the sales and realization of cash. The fundamental objectives of working capital management are as follows:

The company can decrease the engagement of funds in working capital, thus improving the return on capital used in the business. This is done by optimizing the investment in the current assets and by reducing the level of current liabilities. This way the firm can reduce the locking-up of funds in working capital, thereby improving the return on capital employed in the business.

The company should always be in a position to comply with its current obligations that should be supported by the current assets available with the firm.

Marginal return on investment in these assets is not less than the cost of capital employed to finance the current assets.

The firm should sustain the balance between current assets and current liabilities to let the firm meet its daily financial obligations.

9.2.4 Sources of Working Capital

The requirements of working capital of a business can be divided into:

- Permanent or fixed working capital needs
- Temporary or variable working capital needs

A portion of investments in working capital is in the form of permanent investments in fixed assets, because there is always a basic level of current assets that are continuously required by the enterprise to carry on its daily business operations and this minimum cannot be expected to lessen at any time. This minimum level of current assets gives way to permanent or fixed working capital because this part of working capital is permanently blocked in current assets.

A portion of working capital may be needed to cater to seasonal demands and in some special exigencies such as rise in prices, strikes; this proportion of working capital gives way to temporary or variable working capital that cannot be permanently employed gainfully in the business.

The fixed proportion of working capital should be generally financed from fixed capital sources while the temporary or variable working capital requirements of a concern may be met from short-term sources of capital.

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Table 9.1 Sources of Working Capital

Permanent or Fixed	***Temporary or Variable***
1. Shares	1. Commercial banks
2. Debentures	2. Indigenous bankers
3. Public deposits	3. Trade Creditors
4. Ploughing back of profits	4. Installment credit
5. Loans from financial institution	5. Advances
	6. Accrued expenses
	7. Commercial paper
	8. Factoring

Check Your Progress

1. What are the main events in a firm's production and sales cycle which governs the investments in working cycle?
2. On which concepts are GWC and NWC based on?
3. Why is a portion of investments in working capital in the form of permanent investments in fixed assets?

9.3 DETERMINANTS OF WORKING CAPITAL REQUIREMENT

The factors that influence the management of working capital are as follows:

- **Nature of business:** The requirement of working capital of a firm is closely related to the nature of its business. A service firm, for instance an electricity undertaking or a transport corporation, which has a short operating cycle and undertakes its transactions on a cash basis, will have less requirement of working capital. However, a manufacturing concern, for instance a machine tools unit, which has a long operating cycle and sells mostly on credit, will have a considerable requirement of working capital.
- **Seasonality of operations** Firms that have a distinct seasonality in their operations usually have highly fluctuating working capital requirements. Let us consider the example of manufacturing of ceiling fans by an electrical business. Their sales peak during summers and drop considerably during winters. The working capital requirements of such a firm are likely to increase considerably in the summers and fall during the winters. On the other hand, a firm that makes lamps, which will have moderately even sales during the year, will have balanced working capital needs.
- **Scale of operations:** The size or scale of operations of a business is positively related to the requirements of working capital. Greater the size,

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generally larger will be the requirement of working capital due to high overhead charges, inefficient use of available resources and other inherent diseconomies of small size.

- **Market conditions:** Working capital needs are governed by the level of competition prevailing in the marketplace. In the face of keen competition, a larger inventory of finished goods is wanted to cater promptly to customers who may not prefer to wait because other manufacturers will be ready to meet their needs. In addition, ample credit may have to be given to lure customers in a very competitive market. Thus, working capital may tend to be high because of increased investment in the inventory of finished goods and accounts receivable. In the wake of a strong market and weak competition, a firm can do with smaller inventory of finished goods because customers can be served irrespective of delay. Additionally, in such a situation, the firm can invest on cash payment and avoid lock-up of funds in accounts receivable—it can even ask for partial or total advance payment.
- **Conditions of supply:** The inventory of raw materials, stores and spares is dependent on the supply conditions. In case of prompt and adequate supply, the firm can do with less inventory. However, in case of unpredictable and scant supply, the firm must ensure continuity of production. Thus, it would have to acquire stocks, depending on availability, and possess larger inventory. A similar policy may have to be adopted when the raw material is available seasonally and production operations are carried through the year.
- **Length of production or manufacturing cycle:** In a manufacturing business, the requirements of working capital increase directly proportionate to the length of its manufacturing process. This means the longer the manufacture time, the more is the amount of required working capital. If the time required for manufacturing is long, raw materials and supplies will have to be carried for a longer period in processing, with gradual increase in labour and service costs before the finished product is obtained. Distilleries that have an ageing process generally make a comparatively big investment in inventory, while bakeries make less investment in inventory because they sell their products at short time intervals and have a very high stock turnover.
- **Working capital cycle:** This cycle involves purchase of raw materials and stores, its conversion into stocks of finished goods through work-in-progress, conversion of finished stock into sales, debtors and receivables and ultimately realization of cash. The rate at which the working capital completes one cycle decides the working capital requirement; this means the longer the time period of the cycle, the larger is the working capital requirement.
- **Credit policy:** Credit policy delimits working capital's quantum. A firm that buys on credit and sells on cash requires much less working capital. On the other hand, a concern that buys on cash and sells on credit requires

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huge amount of funds as working capital. Credit terms determined by businesses are subject to the prevailing trade practices and dynamic economic conditions. In case of keen competition, there would be pressure to provide ample credit. Nonetheless, there is much scope for managerial discretion in drawing up an appropriate credit policy that is tailored to customers, based on the merits of each case. The collection procedure can be also so drawn up that funds, which would otherwise be available for adhering to operating needs, are not blocked. Thus, adoption of rationalized credit policies would be a major agent in deciding the working capital needs of an business.

- **Business cycles:** Business cycle refers to alternate expansion and contraction in general business activities. In a period of rising prices, i.e., boom, sales increase because of expansion. To meet this increasing level of activity, larger amounts of working capital are required. In a period of depression, sales decline, debtors do not pay promptly and this results in idle working capital.
- **Growth and expansion:** With a growth in business, it makes sense to anticipate that a larger amount of working capital will be required. Apparently, it is not easy to accurately determine the connection between the growth in the volume of a company's business and the rise in its working capital. The composition of working capital in a growing company also changes with financial circumstances and corporate practices. If we consider other variables as equal, growth industries require more working capital than static industries. 'The critical fact, however, is that the need for increased working capital funds does not follow the growth in business activities but precedes it'. Future planning of working capital is, thus, a never-ending requirement for a growing business, or else, it may have considerable earnings but little cash.
- **Earning capacity and dividend policy:** Firms that have established monopoly and create quality products tend to have an improved capacity to earn. These firms may generate cash profits easily from their trade operations and contribute to the needs of working capital. However, a company that maintains an increased but steady rate of dividend may not be able to channelize adequate profits towards its working capital requirements. Variations exist in industry practices with relation to the connection between requirements of working capital and payments of dividend. In some cases, less working capital has been a strong and convincing reason to reduce or even skip cash dividends. However, due to sound liquidity, there are situations when dividend payments are not stopped despite of insufficient earnings in a particular year. Sometimes the dilemma is resolved by paying bonus shares. This facilitates the payment of dividends without drawing away the cash resources and, thus, without decreasing

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working capital. Dividend policy is, thus, a considerable variable in deciding the working capital level in a firm.

- **Price level changes:** Price level changes also determine working capital needs. Increase in raw material prices and increased wages ask for extra funds to be used as working capital. This is in order to maintain the same level of business activity. For companies, however, that raise their prices in proportion, there will be no grave issues with regard to working capital. Moreover, the price rise does not have the same effect on all commodities, and is likely that some firms may not be affected at all. In short, the effect of change in price levels vis-à-vis working capital position differs from one company to another, depending on the nature of operations, standing in the market, and so on.
- **Depreciation policy:** The depreciation policy also affects the quantum of working capital. There are no cash outflows in depreciation charges. In the first place, depreciation affects tax liability and profit retention. Depreciation is a permissible expenditure while calculating the net profit. An increased rate of depreciation lowers the profits and tax liability, and hence more cash profits. A higher rate of depreciation also leads to lesser disposable profits and a smaller dividend payment. Thus, cash is preserved. In the second place, the selection in terms of method of depreciation has critical financial implications. If current capital expenditure is lesser than the provision for depreciation, the position of working capital is improved and there may be no requirement for short-term borrowing. However, if the expenditure on current capital is more than the provision for depreciation, either outside borrowing will have to be used, or a cap placed on dividend payment coupled with retention of profits will have to be adopted to present the working capital position from being adversely affected.
- **Operating efficiency:** The operating efficiency of management is also a crucial variable in determining the level of working capital. An efficient management can create a good working capital position through operating efficiency. Although the management cannot rein in the rise in prices, it can make sure resources are used efficiently by eliminating waste, improving coordination and fully utilizing existing resources. Efficiency of operations increases the cash cycle's pace and improves the working capital turnover. It improves profitability and the internal generation of funds by releasing the pressure on working capital.
- **Profit level:** The nature of the product, hold on the target market, quality of management and monopoly determines the profit earned by a firm. A higher profit margin improves the prospects of generating mere internal funds thereby contributing to the working capital pool. Net profit is a source of working capital to the extent when it has been earned in cash. Cash profit can be calculated by adjusting in the net profit non-cash items like

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depreciation, outstanding expenses and losses written off. In practice, however, net cash inflows from operations cannot be taken as cash available for use at the end of the cash cycle. Even as the company continues to conduct business operations, cash is employed for augmenting stocks, book debts and fixed assets. It must be considered that generation of cash is used to further the interests of the enterprise. Hence, in this context detailed planning, expected activity projections and resulting cash inflows on a daily, weekly and monthly basis assume gravity because measures can be taken to deal with surplus/deficit cash.

The availability of internal funds for working capital requirements is decided by the profit margin and also by the manner of appropriating profits. The availability of such funds would depend upon the profit appropriations for taxation, dividend, reserves and depreciations.

- **Level of taxes:** Companies pay taxes out of profits. This liability is unavoidable and sufficient provisions should be made in the planning for working capital. If there is an increase in tax liability, it leads to additional strain on working capital. Hence, the financial manager plan for taxes in order to avail the benefits of various concessions and provisions.

  The taxes to be paid are decided by the prevailing tax regulations. Very often, taxes have to be paid in advance based on the profit of the previous year. Tax liability is a short-term liability that is payable in cash. The management has no discretion with regard to the payment of taxes—in some cases, non-payment leads to penal action. There is large scope in the reduction of the tax liability through planning. Tax experts can be instructed to avail of the various concessions and incentives as opposed to evasion of taxes. Tax planning is an integral part of working capital planning. The firm's policy to retain or distribute profits also has a bearing on the working capital. The depreciation policy, through its effect on tax liability and retained earnings, has an effect on working capital. The dividend policy and its implications on working capital have also been dealt with.

- **Production policy:** It has been noted that a strategy of constant production may be maintained in order to resolve the working capital problems arising due to seasonal changes in the demand for the firm's product. A steady production policy will cause inventories to accumulate during the off-season periods and the firm will be exposed to greater inventory costs and risks. Thus, if the costs and risks of maintaining a constant production schedule are high, the firm may adopt the policy of varying its production schedules in accordance with the changing demand. Those firms, whose productive capacities can be utilized for manufacturing varied products, can have the advantage of diversified activities and solve their working capital problems.

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They will manufacture the original product line during its increasing demand and when it has an off-season other products may be manufactured to utilize the physical resources and working force. Thus, the production policies will differ from firm-to-firm depending on the circumstances of the individual firm.

9.4 ESTIMATION OF WORKING CAPITAL REQUIREMENT

Many factors affecting working capital show unstable behaviour over even a narrow span of time. That poses a major challenge to the finance manager's predictive powers. Working capital, therefore, cannot be estimated based on benchmarking with other competing firms. The concept and some methods for estimating the working capital of any business are suggested below:

Planning and control techniques include:

1. Conventional methods like:
   - Ratio analysis
   - Fund flow analysis
2. Advanced methods like:
   - Element-wise analysis
   - Statistical methods
   - Operations research methods, and
   - Operating cycle approach

Conventional methods

Conventional techniques for determining and monitoring the working capital use accounting techniques like ratio analysis and fund flow analysis. Here, some useful ratios have been discussed.

Ratio analysis Conventionally, the ratios are established some association between the working capital with either sales or assets. Thus, we get two sets of working capital ratios.

Some balance sheet ratios are,

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Currrent Liabilities}}$$

$$\text{Quick Ratio} = \frac{\text{Current Assets-inventory}}{\text{Currrent Liabilities}}$$

$$\text{CA to TA} = \frac{\text{Current Assets}}{\text{Total Assets}}$$

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$$\text{WC to TA Ratio} = \frac{\text{Working capital}}{\text{Total Assets}}$$

$$\text{Inventory to CA} = \frac{\text{Inventory}}{\text{Current Assets}}$$

$$\text{Receivables to CA} = \frac{\text{Receivables}}{\text{Current Assets}}$$

Likewise, cash, inventory and receivables can be compared with the net working capital or with total assets too. Sometimes net assets numbers are used instead of total assets. In these balance sheet ratios of working capital we are looking for a reasonable structure of current asset items with another item of balance sheet, may it be the working capital, current assets, total assets or net assets.

These ratios suffer with several limitations. Deriving requirement of working capital from the total assets or total working capital is not justified as they are not the drivers of working capital items.

Some sales based ratios are,

$$\text{WC to Sales} = \frac{\text{Working capital}}{\text{Sales}}$$

$$\text{CA to Sales} = \frac{\text{Current Assets}}{\text{Sales}}$$

$$\text{Cash to Sales} = \frac{\text{Cash}}{\text{Sales}}$$

$$\text{Inventory to Sales} = \frac{\text{Inventory}}{\text{Sales}}$$

$$\text{Receivables to Sales} = \frac{\text{Receivables}}{\text{Sales}}$$

$$\text{Payables to Sales} = \frac{\text{Payables}}{\text{Sales}}$$

These are also called turnover ratios. Sales based estimate of working capital is also less reliable because sales can be a determinant of receivables but not for other current asset items. However, sales based ratios are better than asset based ratios.

Firms use some standards to estimate the working capital requirements, and also used the same standards for monitoring the working capital efficiency. Let us take an example.

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Example 9.1: Estimating working capital based on ratios

A firm has developed the following standards for the working capital:

- Total net working capital 20 per cent of sales.
- Current ratio: 3
- Inventory turnover ratio:: 8
- Receivables turnover ratio: 6
- Remaining cash on hand and in bank

If the budgeted sales is ₹ 1 crore, calculate:

(a) Net working capital
(b) Current assets
(c) Current liabilities
(d) Inventory
(e) Receivables and
(f) Cash on hand

Solution:

(a) Net working capital = 0.2 × 1,00,00,000 = ₹ 20,00,000

(b) Current assets:

- Current asset is thrice the current liabilities. This may happen when the difference between the current assets and current liability (working capital) is two times the current liabilities. Means ₹ 1 current liabilities; ₹ 3 current assets and ₹ 2 net working capital.
- Therefore, the current asset must be ₹ 30,00,000 (current liabilities ₹ 10,00,000 and net working capital ₹ 20,00,000)

(c) Current liabilities: ₹ 10,00,000

(d) Inventory: Sales ÷ Inventory turnover ratio = 8. Therefore, 1,00,00,000 ÷ 8 = ₹ 12,50,000 inventory

(e) Receivables: Sales ÷ Receivables turnover ratio = 7.5. Therefore, 1,00,00,000 ÷ 6 = ₹ 16,66,667

(f) Cash on hand: 30,00,000 – 12,50,000 – 16,66,667 = ₹ 83,833

This may be the efficient level of working capital provided the standards used are based on the best internal benchmarking against the policies.

Funds flow analysis Cash-to-cash cycle alone would not be sufficient to explain the phenomena related to working capital. There are many cracks and manholes through which the cash would flow in and out. Capital servicing, tax payment, purchase of fixed assets, retirement of some assets, issue of capital and acceptance of loan immediately affects the circulation of cash. Cash-to-cash cycle can be understood in its entirety only if fund flow analysis is made. Fund flow analysis

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explains the flow of funds from and to all the directions and throws light on from where the funds have been obtained and where they have been applied. Fund flow analysis is not useful in planning of the working capital, but it helps to have a better control which is very useful.

Non-conventional or advanced methods

Non-conventional techniques adopt a more logical approach for forecasting the working capital. Element-wise analysis, use of statistical methods, operations research methods and operating cycle approach are common under this category.

Element-wise analysis Various components of working capital may have an association with different factors. For example, raw materials with consumption cost or production rate, finished goods with cost of production and receivables with sales. It is advisable to take each component, and estimate them separately based on their respective relationship with relevant items of profit and loss account or balancesheet. This is a refinement over the ratio approach. The element-wise analysis is used in the operating cycle approach for the forecast of working capital.

Statistical methods If a perfect linear relationship is assumed between working capital and some other items of financial statements, then management's ability to manage current assets is denied (Ramamurthy, 1976). This is the limitation of ratio analysis. Statistical methods are theoretically the best methods and they can be more effective in working capital projection. A firm can study the correlation of each working capital component with various financial and non-financial factors. Multiple regression analysis can also be considered to understand changes in working capital with changes in more than one factor simultaneously. Estimate of driving factors can provide lead in planning of each component. Such study must be repeated at a frequent interval of time because of fast changing environment.

Operations research method Many researchers have attempted OR based estimates of working capital planning because optimum working capital exists with several conflicting objectives and constraints. Optimization techniques like linear programming and goal programming are among the few which can be mentioned as important tools for planning of the working capital.

Operating cycle approach Conventional methods do not take into account ever-changing form of working capital components. All components are inter-dependent and hence a cyclical process develops. Cash, after it is converted into raw material, work-in-process, finished goods and receivables, is again turning into the cash. Cash input and cash output do not equate with each other, because of profit or loss, and also because of collection rate. Operating cycle method considers all the forms of cash collectively and gives a single criterion for estimating and controlling working capital. Operating cycle method possesses some inherent characteristics so that alternative courses of actions for reducing working capital are revealed. It has been realized, due to the evolution of operating cycle method, that standard of ratios (like a standard current ratio of 2) cannot be relied upon. Operating cycle concept suggests that the optimum level of working capital can be

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determined by the operating funds needed for completing one operating cycle. The duration of operating cycle is equal to the number of days for which cash is tied up in the stages of the operating cycle, starting from cash on hand to acquisition of raw material, processing and selling the goods and realization of proceeds from sundry debtors. The number of days' credit allowed by creditors will have to be set off in the process.

There are two ways the operating cycle period is calculated—(a) based on sales and (b) based on appropriate costs that determine the value of current assets and current liabilities. We will discuss both in the following section.

Operating cycle time (based on sales) The sales based operating cycle period uses the average (or year-end) values of items in current assets and current liabilities to calculate the sales equivalent amount that has been tied up with each item. The sum of all periods of current assets less the sum of period of each current liability item is the operating cycle time.

	Name	Equation
1.	Inventory period	$\frac{\text{Average Inventory}}{\text{Daily Sales}}$
2.	Receivables period	$\frac{\text{Average Receivables}}{\text{Daily Sales}}$
3.	Cash period	$\frac{\text{Average Cash}}{\text{Daily Sales}}$
4	Credit period	$\frac{\text{Average acconts payables}}{\text{Daily Sales}}$

where, Average value = (opening value + closing value) ÷ 2 Daily sales = Sales ÷ 365

Operating Cycle Period

Inventory period + Receivables period + Receivables period +
Cash period + Credit period

Notes:

(a) Some use the year-end values of items of current assets and current liabilities for the calculation of operating cycle period. That may be simple and convey the concept accurately, the average based operating cycle period is little better in accuracy, as the level of these item change gradually over the period.
(b) Some take 360 days in a year rather than 365.
(c) All types of inventory (raw material, semi-finished goods, work-in-process and finished goods) can be combined into one when sales based operating cycle is calculated, because the sales is a common divisor for all items.
(d) For the same logic, one can even take the average of all current assets and divide by the daily sales to get current asset period.

It is apparent that the amount of working capital required at any point in time is governed by the speed with which this cash cycle is sustained. Faster the cycle (i.e., smaller cycle period), lesser is the investment in working capital.

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Operating cycle time (based on cost): A firm can calculate the operating cycle period by dividing the amount of every item in current assets and current liabilities by the cost at which they are determined. In this case the denominator is changed to represent the underlying costs for every item of current assets and current liabilities. The operating cycle time under this method is calculated as follows:

	Name	Equation
1.	Raw material inventory period	$\frac{\text{Average Raw Material Inventory}}{\text{Daily Purchase}}$
2.	Finished goods inventory period	$\frac{\text{Average Finished Goods Inventory}}{\text{Daily Cost of Production}}$
3.	Receivables period	$\frac{\text{Average Receivables}}{\text{Daily Cost of Sales}}$
4.	Cash period	$\frac{\text{Average Cash}}{\text{Daily Expenses}}$
5.	Credit period	$\frac{\text{Average acconts payables}}{\text{Daily Purchase}}$

Operating Cycle Period

Operating cycle + Raw material inventory period + Finished goods inventory period + Receivable period + Cash period – Credit period

Note:

(a) Semi-finished goods may be added into the finished goods at the equivalent value.

(b) Receivables period is often calculated using the daily sales with an argument that once finished goods are sold the selling value is due to the firm and therefore, that is the firm's money, which remains invested in receivables. However, the counter argument is that credit sales is a business custom and also the firm's policy; therefore, cost of sales is what is invested in the receivables by the firm.

(c) Daily expenses are calculated by taking value added expenses (cost of sales less material consumed).

Investment in raw material is at the rate of cost of purchase. Therefore, it is more appropriate to calculate the days for which a rupee remains invested in the raw material as per the Equation based on daily purchases rather than daily sales. Likewise, a rupee remains invested in the finished goods inventory at the rate of cost at which it is produced. Receivables shall be calculated at cost of sales (some calculate it at sales value). Cash balance is for meeting the expenses. Therefore, cash days are calculated at the daily expense rate. Credit period is calculated at the cost of purchase.

The sales based operating cycle is simple in calculation. The appropriate cost based operating cycle probably explains the cycle time of a rupee invested in operations more convincingly. However, the solved example will bring out its limitations that ensue from the simple addition of days even though each component days are calculated using different denominator.

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Example 9.2: Calculation of operating cycle period

Selected financial data of XYZ Company Limited is given below for the successive years:

XYZ Company Limited

₹ in crores

Items	2012–13	2013–14
Sales	2,72,000	3,70,000
Raw materials consumed	1,16,000	2,00,000
Purchase	1,20,000	1,25,000
Cost of Production	1,80,000	2,20,000
Selling & distribution expenses	50,000	52,000
Current assets	1,25,000	1,50,000
Inventories: Raw Material	26,000	25,000
Inventories: Finished Goods	30,000	35,000
Receivables	50,000	55,000
Cash and bank balance	19,000	35,000
Current liabilities & provisions	80,000	90,000
Sundry Creditors	80,000	90,000
Total assets	1,20,000	1,40,000
Working Capital	45,000	60,000

Calculate the operating cycle period using sales a basis as well as appropriate cost as the basis. Discuss from the calculations the (a) results under both the methods and also (b) the working capital trend over the two successive periods. You may take year-end values rather than the average figures.

Solution: *Operating cycle period on sales basis*

2012–13: Daily sales = 272,000 ÷ 365 = 745.21

2013–14: Daily sales = 370,000 ÷ 365 = 1,013.70

	Formula	2012–13	2013–14
RM Inventory Period	$\frac{\text{RM Inventory}}{\text{Daily Sales}}$	$\frac{26,000}{745.21} = 34.89 \text{ days}$	$\frac{25,000}{1,013.70} = 24.66 \text{ days}$
FG Inventory Period	$\frac{\text{FG Inventory}}{\text{Daily Sales}}$	$\frac{30,000}{745.21} = 40.26 \text{ days}$	$\frac{35,000}{1,013.70} = 34.53 \text{ days}$
Receivables Period	$\frac{\text{Receivables}}{\text{Daily Sales}}$	$\frac{50,000}{745.21} = 67.10 \text{ days}$	$\frac{55,000}{1,013.70} = 54.26 \text{ days}$
Cash Period	$\frac{\text{Cash}}{\text{Daily Sales}}$	$\frac{19,000}{745.21} = 25.50 \text{ days}$	$\frac{35,000}{1,013.70} = 34.53 \text{ days}$
Creditors Period	$\frac{\text{Creditors}}{\text{Daily Sales}}$	$\frac{80,000}{745.21} = 107.35 \text{ days}$	$\frac{90,000}{1,013.70} = 88.78 \text{ days}$
Operating Cycle		34.89 + 40.26 + 67.10 + 25.50 – 107.35 = **60.4 days**	24.66 + 34.53 + 54.26 + 34.53–88.78 = **59.2 days**

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Discussion

- There is overall 1.2 day reduction is operating cycle. That means now the amount equivalent to sales is remaining invested in the working capital less by 1.2 days a reduction from 60.4 days to 599.2 days.
- The company enjoys less credit now and also hold more cash than previous year, the overall reduction in the operating cycle period is largely due to efficient handling of raw material and finished goods inventory as well as receivables.
- Management of current assets, except cash, has improved on all fronts in the year 2013–14 as compared to the previous year.

Operating cycle period on appropriate cost basis

Daily purchase

2012–13: Daily purchase = 120,000 ÷ 365 = 328.77

2013–14: Daily purchase = 125,000 ÷ 365 = 342.47

Daily cost of production

2012–13: Daily cost of production = 180,000 ÷ 365 = 493.15

2013–14: Daily cost of production = 220,000 ÷ 365 = 602.74

Daily cost of sales

2012–13: Daily cost of sales = 230,000 ÷ 365 = 630.14

2013–14: Daily cost of sales = 272,000 ÷ 365 = 745.21

Daily expenses

2012–13: Daily expenses = (180,000 + 50,000 -116,000) ÷ 365 = 312.33

2013–14: Daily expenses = (220,000 + 52,000 - 200,000) ÷ 365 = 197.26

	Formula	2012–13	2013–14
RM Inventory Period	$\frac{\text{RM Inventory}}{\text{Daily Purchase}}$	$\frac{26,000}{328.77} = 79.08$ days	$\frac{25,000}{342.47} = 73.00$ days
FG Inventory Period	$\frac{\text{FG Inventory}}{\text{Daily Cost of Prod.}}$	$\frac{30,000}{493.15} = 60.83$ days	$\frac{35,000}{602.74} = 58.07$ days
Receivables Period	$\frac{\text{Receivables}}{\text{Daily Cost of Sales}}$	$\frac{50,000}{630.14} = 79.35$ days	$\frac{55,000}{745.21} = 73.80$ days
Cash Period	$\frac{\text{Cash}}{\text{Daily Expenses}}$	$\frac{19,000}{312.33} = 60.83$ days	$\frac{35,000}{197.26} = 177.43$ days
Creditors Period	$\frac{\text{Creditors}}{\text{Daily Purchase}}$	$\frac{80,000}{328.77} = 243.33$ days	$\frac{90,000}{324.47} = 262.80$ days
Operating Cycle		79.08+60.83+79.35+60.83–243.33 = **36.76 days**	73.0+58.07+73.8+177.43–177.8 = **119.50 days**

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Discussion

- A rupee invested in the operating cycle remains invested in it for 36.76 days in the year 2012–13. This period has significantly increased to 119.50 days.
- The increase in days is due to cash on hand, which is disproportionately higher in the year 2013–14.
- All current assets, other than cash, have a declined cycle period.
- Creditors period has increased somewhat.

One would note that the cost based operating cycle is higher than the sales based operating cycle. A visual inspection of the absolute numbers of each working capital items and sales would convince the reader that there is some difficulty with the specific expense based operating cycle. The denominator is small and they are different for different items of working capital. The small denominator for cash on hand gives a very long cycle time for the cash. Also, the operating cycle period is simply the addition of all current asset items cycle period less that of current liabilities. Each of these items is calculated using the different denominator, which is illogical mathematics.

The application of operating cycle concept has duel objectives: (a) to budget the total funds needed to conduct a period's manufacturing and selling operations, and (b) to derive budgets for individual working capital items. Before the beginning of each period therefore the operating-cycle- period-based working capital budgets should be used for cross checking and/or for modifying the budgets as derived by using ratios (Gupta, 1978).

Operating cycle theory is not new anymore. Still very few large companies in the private sector use it for the planning of working capital. It was mostly used by high growth companies as against the low growth companies. The thumb rules like working capital as percentage of either production or sales is more common in practice for working capital planning.

Check Your Progress

4. What does longer manufacture time imply with reference to requirement of working capital?
5. Why is sales based estimate of working capital unreliable?
6. State the two ways of calculating the operating cycle period.

9.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Investing in working capital is governed by the following main events in a firm's production and sales cycle:

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- Raw materials: purchase and payment
- Finished goods: sale to the final customer
- Sales: cash collection

2. GWC is based on financial or going concern concept, whereas the NWC is based on accounting concept.
3. A portion of investments in working capital is in the form of permanent investments in fixed assets, because there is always a basic level of current assets that are continuously required by the enterprise to carry on its daily business operations and this minimum cannot be expected to lessen at any time.
4. In manufacturing business, the requirements of working capital increase directly proportionate to the length of its manufacturing process. This means the longer the manufacture time, the more is the amount of required working capital.
5. Sales based estimate of working capital is also less reliable because sales can be a determinant of receivables but not for other current asset items.
6. There are two ways the operating cycle period is calculated—(a) based on sales and (b) based on appropriate costs that determine the value of current assets and current liabilities.

9.6 SUMMARY

- Working capital is a very critical financial tool in the hands of organizations. It lays firm foundations for making the operations of a firm profitable and viable.
- Investing in working capital is governed by the following main events in a firm's production and sales cycle: raw materials, finished goods and sales.
- Operating cycle is the time that lies between the purchase of raw materials and the collection of cash for sales, while cash cycle is the time between the payment for purchase of raw material and collection of cash for sales.
- There are two concepts of working capital, gross and net. Gross working capital refers to as 'working capital' which means the total of current assets. NWC is the difference between current assets and liabilities.
- Working capital can also be studied under two heads: fixed, regular or permanent and variable, seasonal, or special.
- The factors that influence the management of working capital are as follows: nature of business, seasonality of operations, scale of operations, market conditions, credit policy, price level changes, operating efficiency, etc.

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- For planning of the working capital, conventional techniques like working capital ratios are useful, and for controlling cash flow analysis is also useful. Working capital ratios basically compare different current asset items and working capital with sales or assets. Implicitly this method believes that the current asset is a function of either sales or assets.
- In the non-conventional techniques, element-wise analysis is done or statistical or operations research method is used, or the operating cycle concept is applied. Element-wise analysis looks for the drivers of each component of working capital and accordingly estimates the working capital; in statistical analysis the degree of association between the drivers and the component of working capital is studied through the statistical tools; operations research tools like linear programming and goal programming attempt to optimize the investment in working capital.

9.7 KEY WORDS

- **Working capital:** That part of a firm's capital which is required for financing short-term or current assets
- **Current assets:** Those assets which in the ordinary course of business can be, or will be, turned into cash within one year without undergoing a diminution in value and without disrupting the operations of the firm
- **Operating cycle:** The time that elapses between the purchase of raw materials and the collection of cash for sales
- **Cash cycle:** The time between the payment for raw material purchase and collection of cash for sales
- **Gross working capital (GWC):** Working capital which means the total of current assets

9.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. What is an operating cycle?
2. Mention the items which can be estimated based on a firm's financial statements.
3. How is working capital classified on the basis of concept?
4. What is GWC? What are its implications?
5. List the objectives of working capital management.

6. What are the major sources of working capital?
7. List the methods of estimating and monitoring of working capital.

Long Answer Questions

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1. Explain NWC and its implications.
2. Examine the classification of working capital on the basis of time.
3. Discuss, in detail, the determinants of working capital requirement.
4. What are methods for estimating and monitoring the working capital? Describe them in detail and discuss the relative merits and demerits of them.
5. What are methods of calculating the operating cycle time? Discuss them and also bring out the relative advantages and disadvantage of them.

9.9 FURTHER READINGS

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UNIT 10 FUND FLOW STATEMENT

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Structure

10.0 INTRODUCTION

The traditional balance sheet reveals the financial position of an organization by mentioning not only the sources of its resources but also the deployment of its resources. However, such a statement fails to identify the factors that are responsible for the change in the financial position of the organization between two financial periods. The identification and analysis of the said factors are essential as they have a direct impact on the working capital. It is pertinent to mention here that the management of working capital has always been recognized as a prerequisite for the smooth functioning of the organization. Therefore, the management always prefers to have a study that would help it to identify and analyse the factors that result in the change of working capital. In fact, such changes generally take place either due to an inflow or outflow of fund which is not revealed by the traditional balance sheet. The most popular framework used for this purpose is statement of change in financial position. The said statement aims to describe the changes in the financial position of a concern during a particular period. In fact, such a statement provides the basis for policy formulation by acting as a financial reporting media. The statement of changes in financial position is also known as funds flow statement, where got were gone statement, management funds statement, etc. However, we may use the term funds flow statement in this book.

10.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning of funds flow statement
- Describe the uses and limitations of fund flow statement
- Discuss the preparation, sources and uses of funds

10.2 FUND FLOW STATEMENT: MEANING, USES AND LIMITATIONS

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In this section, we will have a look of the meaning, uses, need and limitations of fund flow analysis and statement.

Meaning and Definition of Fund

For a clear understanding of the funds flow analysis, the meaning of the terms *fund* and *flow* must be clear in one's mind.

Fund

The term *fund* can be used both in broader and narrow sense. In broader sense, it represents the working capital (current assets—current liabilities) of a concern while in narrow sense it represents only cash balances of a firm. Accordingly two statements can be prepared, viz.,

- *Funds flow statement:* A statement prepared on the basis of net current assets/working capital which is calculated by subtracting current liabilities from current assets.
- *Cash flow statement:* A statement that is governed by the narrow sense of fund, *i.e.*, cash balances, and therefore, considers only receipts and payments of cash and transactions affecting cash position in its preparation.

Flow

Flow of fund refers to a business transaction that causes a change in the amount of fund (working capital) that exists before the maturity of the transaction. The flow of fund is recognized from the degree of change in the amount of working capital. If a transaction increases the amount of working capital, it is referred to as *source of fund* (inflow) whereas the transaction that decreases the amount of working capital results in the *application of fund* (outflow). If a transaction fails to cause a change in the amount of working capital, it does not amount to flow of fund. Suppose a company has a fund (Current assets–Current liabilities) of ₹ 1,20,000 on 31 December 2018. On 1January 2019, it purchased a computer costing ₹ 10,000 that brings decline in the amount of cash to the extent of ₹ 10,000 which in turn decreases the amount of working by ₹ 10,000. Accordingly, the amount of fund is reduced to ₹ 1,10,000 (1,20,000–10,000). The purchase of computer is treated as flow of fund (outflow) because it brought a change in the amount of working capital (fund) from ₹ 1,20,000 to ₹ 1,10,000.

After analysing the above example, it is clear that a change in the amount of working capital from ₹ 1,20,000 to ₹ 1,10,000 is the result of change in the two items of the company. Firstly, the amount of cash (a current item) is reduced by ₹ 10,000, and secondly, the amount of fixed asset (non-current item) is

NOTES

increased by the same amount. From this fact, we can conclude that:

- the flow of fund (change in working capital) occurs when a similar change is observed simultaneously in one current and one non-current account as a result of a single transaction;
- the transaction that involves only current accounts or only non-current accounts does not amount to flow of fund (change in working capital); and
- the flow of fund, *i.e.*, change in working capital has a similar impact both on current and non-current accounts. Symbolically, this can be expressed as

$$\sum\Delta WC = \sum\Delta\ CA = \sum\Delta\ NA$$

where, $\sum\Delta$ = aggregate change in

WC = working capital

CA = current accounts

NA = non-current accounts

Thus, the aggregate change in the working capital of a concern during a particular period can be computed by considering all changes which occurred either in the current accounts or in the non-current accounts. The changes which occurred in the current accounts as a result of flow of fund are reflected in a statement known as *schedule of changes in working capital*, whereas similar changes in the non-current accounts are shown in the *statement of changes in financial position* also known as *funds flow statement*.

In the above paragraphs we saw that the flow of fund is identified by analysing changes in current items and non-current items. Therefore, it becomes imperative to have a detailed list of current and non-current accounts.

Current Accounts

Current accounts consist of current assets and current liabilities, like:

- Current assets:
- inventories
- bills receivable
- cash and bank balances
- investments
- sundry debtors
- prepaid expenses (temporary)
- Current liabilities:
- bills payable
- sundry creditors
- outstanding expenses and dues
- proposed dividend
- provision for taxation

- bank overdraft
- provision against current assets

Non-current Accounts

NOTES

Non-current accounts comprise fixed assets and long-term liabilities like:

- Fixed assets:
- land and building
- plant and machinery
- furniture
- long-term investment
- goodwill
- preliminary expenses
- trade marks
- patent rights
- deferred expenses
- discount on issue of shares/debentures
- debit balances of profit and loss account
- Long-term liabilities:
- share capital (equity and preferential)
- share premium account
- share forfeited account
- capital redemption reserve
- capital reserves
- loans (long-term)
- debentures
- general reserves
- provision for depreciation on fixed assets
- bank loan
- credit balances of profits and loss account

Illustration 10.1 Explain the effect of the below-mentioned transactions on fund (working capital):

(i) Purchase 6,000 shares at ₹ 10 each (temporary).
(ii) Further capital of ₹ 12,000 invested during the year.
(iii) Sale of unused plant (completely depreciated) for ₹ 40,000.
(iv) Paid cash to sundry creditors ₹ 30,000.
(v) Purchase of Insurance Policy (5 years) of ₹ 65,000.

Solution

(i) This transaction will not affect the working capital (fund) because of its temporary nature. On one hand, current assets will be increased by temporary investment in shares to the extent of ₹ 60,000, and on the other hand, cash will go out of the business which will reduce the current asset by the same amount. Hence, current assets will not be affected.

NOTES

(ii) The additional capital of ₹ 12,000 will increase the share capital, a non-current item, and at the same time, it will also increase cash, a current item. Thus it will result in the inflow of fund (source).
(iii) On the one hand, sale of unused plant will decrease the non-current asset (plant), and on the other hand, it will increase the amount of current asset (cash) by ₹ 40,000. Therefore, it the amount of fund will increase.
(iv) The transactions will change only current account, viz., cash and sundry creditors, leaving fund unaffected.
(v) Purchase of insurance policy will affect current asset (cash) on the one hand and non-current asset (insurance policy) on the other hand. Thus, the transaction will result in the outflow of fund to the extent of ₹ 65,000.

Funds Flow Statement: Managerial Uses, Need and Limitations

Funds flow statement indicates the amount of change in various balance sheet items between two accounting dates. It shows the sources and uses of funds during an accounting period. A funds statement is prepared in summary form to indicate changes (and trends if prepared regularly) occurring in items of financial conditions between two different balance sheet dates. According to Anthany, 1970:

> *The funds flow statement describes the sources from which additional funds were derived and the use to which these sources were put.*

Foulke, 1976 defines funds flow statement as:

> *A statement of sources and application of funds is a technical device designed to analyse the changes in the financial condition of a business enterprise between two dates.*

As per professor *MA Sahaf* funds flow statement *is a technique used to summarize the financial operations of an organization by studying the sources and application of funds during the accounting period*. Such a statement helps to identify the changes which have taken place and to demonstrate their impact upon the liquid resources of the business. It provided a clear indication of the changes which have taken place in the financial position of the enterprise, particularly for the people who are not well versed in reading balance sheets.

Managerial Uses of Funds Flow Statement and Need

Funds flow statement plays a significant role in the evaluation of overall performance. Such a statement provides insights into the financial and investing operations of a business. It throws light on the financial strategy of a firm and guides financial experts in the interpretation and predictions of the same. The National Association of Accountants, 1971 in their bulletin list the following uses of this statement:

- estimating the amount of funds needed for the growth;
- improving rate of income on assets;
- planning temporary investments of surplus funds and planning for the working capital;
- securing additional funds when needed; and
- planning the payment of dividends.

NOTES

Further, an effective funds flow analysis can offer the following benefits to a business firm:

- It helps the management in operating and investment decisions by providing a complete picture of sources and applications of funds.
- It guides experts in the formulation of future financial policies as it discloses the financial deficiencies of a specified period.
- It can make possible the efficient and economical utilization of future financial resources.
- It provides additional and significant data for decision making which is not presented by historical statements.
- It highlights the relationship between the working capital and the net income.
- It evaluates past financial performance by disclosing the means and uses of resources.
- It proves a meaningful technique for economic analysis.

Limitations of Funds Flow Statement

Despite its number of uses, the funds flow statement suffers from number of limitations which are listed below:

- It fails to cover as sufficient information as disclosed by income statement or balance sheet and as such cannot replace such statements.
- It is of secondary nature as it is prepared with the information as supplied by financial statements.
- The statement ignores the changes in working capital items, and therefore, fails to throw light on the financial position of the concern.
- As this statement is simply re-arrangement of data as supplied by financial statement, the accuracy of the statement is doubtful.
- It is a crude device compared to financial statement because it does not touch non-fund items.
- It fails to reveal continuous changes.

Check Your Progress

1. Define the term fund in the broader and narrow sense.
2. Where are the changes in the non-current accounts of a firm represented?

10.3 PREPARATION OF FUNDS FLOW STATEMENT: SOURCES AND USES OF FUNDS

NOTES

The construction of funds flow statement involves decisions regarding the following two important facts:

- sources of information; and
- procedural framework.

Sources of Information

For the preparation of funds flow statement, the following information should be available:

- Two comparative balance sheets—one at the beginning and the other at the end of the period.
- Summarized income statement comprising non-fund and non-operating items required for computing funds from operation Non-fund items are the transactions that may cause change (increase or decrease) in the reported net profit but do not actually change the amount of fund (working capital). The best example of such an item can be depreciation on fixed assets.
- Non-operating items refer to transactions incidental to the business. For example, sale of fixed assets, profits from sale of assets, etc.
- Statement of retained earnings to identify hidden information.
- Supplementary information regarding change in the non-current accounts like plant and machinery, building, share capital, debentures, etc.

This is the minimum information required for the purpose. Any information, in addition to that mentioned above shall make the funds flow analysis more effective.

Procedural Framework

Procedural framework explains the procedure involved in the preparation of two statements, viz.,

- Statement or schedule of changes in working capital; and
- Statement of source and application of funds.

Statement or Schedule of Changes in the Working Capital

Statement or schedule of changes in the working capital is a statement that compares the change in the amount of current accounts (current assets and current liabilities) on two balance sheet dates and highlights its impact on working capital. The format of this statement is as follows:

NOTES

Statement or Schedule of Changes in Working Capital

	Amount 1st Year (₹)	Amount 2nd Year (₹)	Effect on Working Capital	
			Increase (+) (₹)	Decrease (–) (₹)
A. *Current Assets*:				
Cash				
Trade debtors				
Stock				
Bill receivables				
Pre-payments				
Others				
Total Current Assets (A)				
B. *Current Liabilities:*				
Trade creditors				
Bills payable				
Outstanding expenses				
Provision for income tax				
Proposes dividend				
Others				
Total Current Liabilities (B)				
Working Capital (A – B)				
Increase/Decrease in working capital				

The changes in current accounts *i.e.*, current assets and current liabilities are to be computed by comparing the figures for such accounts in the current period with that of the previous period. The amount of change so computed for each item of the current account alongwith its impact on the amount of working capital is to be recorded in the schedule of change in working capital.

To analyse the effect on working capital as a result of change in current assets and current liabilities, the following facts should be considered:

	Nature of transaction	*Effect on working capital*
1.	Increase in current asset	Increase (+)
2.	Decrease in current asset	Decrease (–)
3.	Increase in current liabilities	Decrease (–)
4.	Decrease in current liabilities	Increase (+)

Illustration 10.2 The comparative balance sheet of M/s Suman Ltd. as on 31st December, 2011 and 2012 were as follows:

Items	*31st December*	
	2011 (₹)	*2012* (₹)
Assets:		
Land and building	1,02,000	1,10,000
Plant and machinery	56,000	44,000
Sundry debtors	32,000	24,000
Inventory	70,000	61,000
Bills receivable	23,000	17,000
Cash and bank balance	40,000	47,000
Total	3,23,000	3,03,000

NOTES

Items	31st December	
	2011 (₹)	2012 (₹)
Liabilities:		
Share capital	1,40,000	1,30,000
Debentures	38,400	28,600
Reserves	97,900	1,02,550
Provision for taxation	2,700	2,850
Proposed dividend	24,000	18,000
Bills payable	10,000	10,000
Sundry creditors	10,000	11,000
Total	3,23,000	3,03,000

Prepare a schedule of changes in working capital.

Solution

Schedule of Changes in Working Capital

Items	2011 (₹)	2012 (₹)	Effect on Working Capital	
			Increase (+) (₹)	Decrease (–) (₹)
A. Current Assets:				
Sundry debtors	32,000	24,000		8,000
Inventory	70,000	61,000		9,000
Bills receivable	23,000	17,000		6,000
Cash and Bank balance	40,000	47,000	7,000	
Total Current Asset (A)	1,65,000	1,49,000		
B. Current Liabilities:				
Provision for taxation*	2,700	2,850		150
Proposed dividend*	24,000	18,000	6,000	
Bills payable	10,000	10,000		
Sundry creditors	10,000	11,000		1,000
Total Current Liabilities (B)	46,700	41,850		
Working Capital (A – B)	1,18,300	1,07,150		
Decrease in working capital		11,150	11,150	
	1,18,300	1,18,300	24,150	24,150

Remember, both provision for taxation and dividends are treated here as current items.

NOTES

Illustration 10.3 The summarized balance sheet of M/s Sugee Ltd. as on 31st March are given below:

Liabilities	*2011* (₹)	*2012* (₹)	*Assets*	*2011* (₹)	*2012* (₹)
Share capital	2,00,000	2,50,000	Land & Building	2,00,000	1,90,000
Debentures	50,000	90,000	Machinery	1,50,000	1,74,000
Profit & Loss A/c	30,500	30,600	Inventory	1,00,000	74,000
Bank loan	70,000	–	Sundry debtors	80,000	94,200
Creditors	1,50,000	1,35,200	Cash	500	8,600
Provision for taxation	30,000	35,000			
	5,30,500	5,40,800		5,30,500	5,40,800

You are required to prepare schedule of changes in working capital.

Solution

Schedule of Changes in Working Capital

Items	*2011* (₹)	*2012* (₹)	*Effect on Working Capital*	
			Increase (+) (₹)	*Decrease* (–) (₹)
A. *Current Assets:*				
Inventory	1,00,000	74,000		26,000
Sundry debtors	80,000	94,200	14,200	
Cash	500	8,600	8,100	
Total Current Asset (A)	1,80,500	1,76,800		
B. *Current Liabilities:*				
Creditors	1,50,000	1,35,200	14,800	
Provision for taxation	30,000	35,000		5,000
Total Current Liabilities (B)	1,80,000	1,70,200		
Working capital (A – B)	500	6,600		
Increase in working capital	6,100			
	6,600	6,600	37,100	37,100

Statement of Sources and Applications of Funds

For the preparation of statement of sources and application of funds, we should be clear about the terms *sources* and *applications*.

Sources (inflow) refer to such business transactions that increase the amount of fund (working capital) and *applications* (outflow) means such transactions that result in the reduction of fund.

As discussed already, such an increase or decrease in the fund may take place when current and

non-current items are changed simultaneously as a result of a transaction. The *increase* in the fund (source) is recorded as a *credit* and the *decrease* in the fund (application) is recorded as a debit. Therefore, credits represent sources of fund and debits represent application of fund. For better understanding of the concept of fund, important sources and uses of funds are summarized below:

Sources of Funds

- Operational profits or funds from operation;
- Issue of share capital or debentures;
- Sale of fixed assets and long-term investments (actual amount realized);
- Income from investments (dividend received); and
- Long-term loans.

Applications of Funds

- Repayment of capital (including redemption of preferential shares);
- Redemption of debentures;
- Payment of long-term loans;
- Purchase of investments;
- Purchase of fixed assets;
- Payment of taxation/proposed dividend if treated as non-current items; and
- Operational loss

Thus, from the above discussion, we may conclude that:

- Increase in non-current assets = Applications of funds
- Decrease in non-current assets = Sources of funds
- Increase in non-current liabilities = Sources of funds
- Decrease in non-current liabilities = Applications of funds

The dual-aspect concept of accounting suggests that the total amount of sources of funds must reconcile with the total amount of applications of funds. This principal is similar to that of the balance sheet principal where total assets are equal to total liabilities. Therefore,

- Sources of funds = Applications of funds
- Increase in liabilities + Decrease in assets = Decrease in liabilities + Increase in assets.

Format of Funds Flow Statement

Different formats are used for this purpose depending upon the objective of analysis. However, the commonly used format is 'account form' (as given below) where sources are shown on the left side and the application of funds on right side of the statement.

Statement of Sources and Application of Funds

Sources	(₹)	*Applications*	(₹)
Issue of shares	xx	Redemption of shares	xx
Issue of debentures	xx	Redemption of debentures	xx
Sale of fixed assets	xx	Purchase of fixed assets	xx
Sale of long-term investments	xx	Repayment of loans	xx
Bank loans	xx	Purchase of investments	xx
Long-term loans	xx	Operational loss	xx
Operational profit	xx	Increase in working capital (as per schedule of change in WC)	xx
Decrease in working capital (as per schedule of changes in WC)	xx		
	xx		xx

NOTES

Funds from Operation/Operational Profit

The main source of fund for an enterprise is the *funds from operation* that represents actual amount of profit as generated by the business. For the funds flow statement, the net profit as disclosed by profit and loss account is adjusted in order to calculate the actual amount of fund from operation. This is done to find the effect of the items such as depreciation and distribution of profits (general reserve, dividend, provision for taxation), loss from sale of asset, etc., on net profit which actually do not result in the outflow of fund but were treated so in the preparation of profit and loss account of the firm. In the same way, the impact of items like dividend received on investment, capital gains, etc., which do not represent income (inflow) from business operation, must be treated properly. The procedure for adjusting profits as disclosed by profits and loss account in order to ascertain funds from operation is as under:

	(₹)	(₹)
Net profits as per profit and loss account		
Add: Items which do not result in the outflow of fund:		xxx
• Depreciation charged during the year	xxx	
• Loss on sale of fixed assets/investments	xxx	
• Capital expenditure (like goodwill, preliminary expenses, patents) written off against profit and loss account	xxx	
• Provision for income tax/proposed dividend	xxx	
• Any other item	xxx	xxx
Less: Items which do not result in the inflow of funds:		
• Gains on sale of fixed assets/investment	xxx	
• Dividend received on investment (credited to profit and loss account)	xxx	
• Any other item	xxx	xxx
Profit from business operation or fund from operation	xxxx	

NOTES

Adjustment of Typical Items

Before attempting a practical problem, we must be familiar with the treatment of some typical transactions. Accordingly, the discussion that follows deals with adjustment procedure of typical transactions in fund flow analysis.

- Provision for Taxation There are two approaches to adjust the item of provision for taxation, viz.,
- *As a current item* Under this approach, the item of provision for taxation is treated as current liability and accordingly it is adjusted in the schedule of changes in the working capital. However, while attempting a practical problem on fund flow analysis, the item of tax (if any) given outside the trial balance should be omitted under this approach. The logic behind the omission is that such an adjustment item (actual payment of tax) will affect two current accounts, *i.e.*, cash and provision for taxation. Therefore, the transaction will not result in the flow of fund (application).
- *As a non-current item* Under this approach, it is considered as an appropriation of profits and thus a non-current liability. Accordingly, the amount of current provision for taxation is to be adjusted in the funds from operation and the actual payment of tax appears in the funds flow statement as an application.

  Note: Students may note that it is desirable to treat the item of provision for taxation as current liability as generally it is the immediate obligation of the concern to pay tax to the government. As such, it seems somewhat irrational to treat provision of tax as an appropriation of profit.

- **Proposed Dividend** It has the same treatment as that of provision for taxation.

- **Interim Dividend** It is the dividend paid in between two balance sheet dates. It is a non-operating item and as such is adjusted in the calculation of profits from operation.

- **Depreciation** The depreciation is a non-fund item that does not result in the flow of cash. It involves simply a book entry without actual payment of cash. This entry in the book account which debits profit and loss account and credits the fixed asset account, reduces the amount of profit and the book value of the fixed assets. As such, depreciation does not affect the amount of fund (working capital). Thus, the amount of depreciation is adjusted in the computation of profits from operation.

- **Preliminary Expenses** Preliminary expenses like depreciation is a non-fund item which simply involves a book entry. Every year a portion of such expenses is written off by debiting them to profit and loss account. However, this treatment to preliminary expenses neither results in the flow of fund nor it is considered as an operating charge. Thus, the amount of preliminary

expenses written off during the current period is to be added back to the net profit as to determine funds from operation.

- **Goodwill** The amount of goodwill written off does not involve flow of funds but requires simply book entry—debited to the profit and loss account. Therefore, while computing the funds from operations, the amount of goodwill written off during the current period is added back to the net profits for the year.
- **Creation of the Reserves** Since reserves are created out of profits, therefore, such reserves constitute an appropriation of profit and not an operating charge against profits. Further, the creation of reserve does not affect the amount of fund. Therefore, the current amount of the reserve is to be added back to the net profit to determine funds from operation.
- **Gain or Loss from the Sale of a Fixed asset** Firms often transfer gain or loss from the sale of asset to profit and loss account. The treatment of this item in the funds flow analysis is that it is to be adjusted in the computation of funds from operation, this being a non-funds item. Thus, the gain from the sale of the asset is deducted from the net profit and vice-versa to determine profits from operation.

Preparation of Working Accounts and Notes (Hidden Transaction)

Preparation of working accounts and notes is an important step in the funds flow statement. The need for such accounts and notices arises to find out some hidden information required for the funds flow statement. The information like depreciation, provision for taxation, sale or purchase of assets etc. is made available by this step. The following illustration will help in the clear understanding of this attempt.

Example The information relating to X Co. Ltd. regarding a machinery stands as:

	31st Dec. (2011)	31st Dec. (2012)
	(₹)	(₹)
Value of Machinery	1,00,000	2,25,000
Depreciation on machinery during the year 2012		30,000

Calculate the actual amount of application used for the purchase of machinery during the year 2012.

Solution Apparently it looks that the amount of application for the purchase of machinery during the year 2012 is ₹ 1,25,000 (2,25,000 – 1,00,000). But actually it is ₹ 1,55,000 (1,25,000 + 30,000). The value of machinery as on 31st December, 2012 (2,25,000) is the ad-justed amount from which the amount of depreciation has already been deducted. In order to calculate the actual

amount of appli-cation for the purchase of machinery, the amount of depreciation should be added back to the value of machinery. Thus, actual amount will be:

NOTES

	(₹)
Value of machinery as on 31st December, 2012	2,25,000
Add: Depreciation charged during the year	30,000
	2,55,000
Less: Value of machinery as on 31st December, 2011	1,00,000
Value of machinery purchased during the year (Application)	1,55,000

The value of machinery purchased during the year 2012 can also be ascertained with the help of an account stated as follows:

Machinery Account

Particulars	(₹)	*Particulars*	(₹)
To Balance b/d	1,00,000	By depreciation	30,000
To Cash-purchases (balancing figure)	1,55,000	By Balance c/d	2,25,000
	2,55,000		2,55,000

In the above account, entries regarding opening and closing balances, depreciation, profit or loss from sale of machinery, profit or loss on revaluation etc. are to be recorded. The bal-ancing figure in the account will represent either sale proceeds or acquisition cost of the machinery.

In the same way, ledger accounts may be prepared to find out inflow/outflow of funds from other non-current assets and liabil-ities like investment account, building account, capital account, debentures account etc.

Illustration 10.4

Balance Sheet of Self Ridges Ltd.

Liabilities	*31st Dec. 2011* (₹)	*31st Dec. 2012* (₹)	*Assets*	*31st Dec. 2011* (₹)	*31st Dec. 2012* (₹)
Share capital	2,00,000	2,30,000	Plant and machinery	1,90,000	2,10,000
Trade creditors	80,000	1,00,000	Building	1,05,000	1,37,000
Bank loan	40,000	25,000	Inventory	20,000	27,000
Mortgage	–	25,000	Trade debtors	40,000	55,000
Profit & Loss A/c	65,000	83,000			
Cash	30,000	34,000			
	3,85,000	4,63,000		3,85,000	4,63,000

Prepare from the above comparative balance sheet:

(a) A schedule of change in working capital; and

(b) Funds flow statement.

Solution

NOTES

Schedule of Changes in Working Capital

Items	*2011* (₹)	*2012* (₹)	*Effect on Working Capital* Increase (+) (₹)	Decrease (–) (₹)
A. *Current Assets:*				
Trade debtors	40,000	55,000	15,000	
Inventory	20,000	27,000	7,000	
Cash	30,000	34,000	4,000	
Total Current Asset (A)	90,000	1,16,000		
B. *Current Liabilities:*				
Trade creditors	80,000	1,00,000		20,000
Total Current Liabilities (B)	80,000	1,00,000		
Working Capital (A – B)	10,000	16,000		
Increase in working capital	6,000			6,000
	16,000	16,000	26,000	26,000

Working Note:

The increase in working capital is ascertained by subtracting working capital of 2011 from the working capital of 2012. The working capital for 2011 and 2012 is calculated as under:

Working capital as on 31st December, 2011:

= Total Current Assets – Total Current Liabilities

(as on 31st Dec., 2011) (as on 31st Dec., 2011)

= ₹ 90,000 – ₹ 80,000 = ₹ 10,000

Working capital as on 31st December, 2012:

= Total Current Assets – Total Current Liabilities

(as on 31st Dec., 2012) (as on 31st Dec., 2012)

= ₹ 1,16,000 – ₹ 1,00,000 = ₹ 16,000

Therefore, increase in working capital = Wo
rking capital as on 31st Dec., 2012 – Working capital as on 31st Dec., 2011

= ₹ 16,000 – ₹ 10,000 = ₹ 6,000

Funds Flow Statement

Sources	*Amount* (₹)	*Applications*	*Amount* (₹)
Share capital (2,30,000 – 2,00,000)	30,000	Plant and machinery (2,10,000 – 1,90,000)	20,000
Mortgage	25,000	Building (1,37,000 – 1,05,000)	32,000
Profits/Funds from operation (83,000 – 65,000)	18,000	Bank loan (40,000 – 25,000)	15,000
		Increase in working capital	6,000
	73,000		73,000

Note: In the above illustration, working accounts and notes have not been prepared as there is no adjustment item. Now, in the next few illustrations we will study the adjustment of typical items and also the preparation of working accounts.

NOTES

Check Your Progress

3. What effect does an increase in current liabilities have on the working capital?
4. How is goodwill treated in the fund flow analysis?

10.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. In the broader sense, fund represents the working capital (current assets and current liabilities) of a concern while in the narrow sense it represents only cash balances of a firm.
2. The changes which occur in the non-current accounts if a firm is reflected in the state of changes in financial position also known as funds flow statement.
3. An increase in current liabilities results in a decrease in the working capital.
4. While computing the funds from operations, the amount of goodwill written off during the current period is added back to the net profits for the year.

10.5 SUMMARY

- Statement of changes in financial position is a statement designed to describe the changes in the financial position of a concern during a particular period.
- Fund in a broader sense, represents the working capital (current assets – current liabilities) of a concern while as in narrow sense it represents only cash balances of a firm.
- Flow of fund would mean when a business transaction causes a change in the amount of fund (working capital) that exists before the maturity of the transaction.
- Funds Flow Statement is a technique used to summarize the financial operations of a concern by studying the sources and application funds during the accounting period.
- Statement or Schedule of changes in working capital is a statement that compares the change in the amount of current accounts, current assets and current.
- Sources refer to a situation when a transaction increases the amount of fund (working capital).

- Application means a transaction that results in the reduction of fund.
- The dual-aspect concept of accounting suggests that the total amount of sources of funds must reconcile with the total amount of application of funds.

NOTES

10.6 KEY WORDS

- **Flow of fund:** It refers to a business transaction that causes a change in the amount of fund that exists before the maturity of the transaction.
- **Fund flow statement:** It is a statement prepared on the basis of net current assets/working capital which is calculated by subtracting current liabilities from current assets.
- **Schedule of changes in the working capital:** It is a statement that compares the change in the amount of current accounts (current assets and current liabilities) on two balance sheet dates and highlights its impact on working capital.
- **Sources:** It refers to such business transactions that increase the amount of fund (working capital).
- **Applications:** It refers to such transactions that result in the reduction of fund.

10.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. Define the terms:

   (i) Funds (ii) Flow of Funds (iii) Funds Flow Statement
2. What is the procedure for the preparation of Funds Flow Statement?
3. What information would you require to prepare a statement of sources and application?
4. Write short notes on:

   (a) Non-operating items (b) Funds from operations (c) Current

Long Answer Questions

1. What is a Funds Flow Statement? Examine its managerial uses.
2. Examine the major sources and applications of working capital.
3. The comparative balance sheet of MAS Ltd., as on 31st December, 2008 and 2009 were as follows:

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Assets	2008 (₹)	2009 (₹)	Liabilities	2008 (₹)	2009 (₹)
Building	5,00,000	5,10,000	Share capital	5,50,000	7,00,000
Furniture and fixtures	2,20,000	2,50,000	Debentures	3,00,000	3,15,000
Plant	3,00,000	3,40,000	Profit and Loss account	3,55,000	3,75,000
Stock	1,25,000	1,75,000	Bills payable	50,000	40,000
Bills receivables	60,000	90,000	Bank overdraft	30,000	20,000
Cash balance	80,000	85,000			
	12,85,000	14,50,000		12,85,000	14,50,000

You are given the following additional information:

(i) Depreciation on building and plant during the year were ₹ 20,000 and 10,000 respectively.

(ii) Dividend amounting to ₹ 10,000 was paid during 2009.

Prepare a funds flow statement and a statement of changes in working capital.

4. The summarized balance sheet of ESS BEE Enterprises on 31st of Dec. 2008 and 2009 are given below:

Balance Sheet of ESS BEE Enterprises

Liabilities	2008 (₹)	2009 (₹)	Assets	2008 (₹)	2009 (₹)
Trade creditors	85,000	60,000	Bank balance	1,00,000	1,00,000
Accounts payable	40,000	50,000	Trade debtors	80,000	1,00,000
Bank overdraft	15,000	17,000	Stock	70,000	60,000
Provision for income tax	60,000	80,000	Building	3,20,000	3,50,000
P & L A/c	2,20,000	2,70,000	Plant	3,50,000	4,20,000
Share capital	8,00,000	9,20,000	Investment	3,00,000	3,67,000
	12,20,000	13,97,000		12,20,000	13,97,000

The following additional information is obtained from the general ledger:

(i) Income-tax paid during the year amounting to ₹ 45,000

(ii) Depreciation charged to building and plant during the year was ₹ 40,000 and 35,000 respectively.

You are required to prepare:

(i) Schedule of charges in working capital, and

(ii) Funds flow statements.

10.8 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 11 CASH FLOW STATEMENT

NOTES

Structure

11.0 INTRODUCTION

Cash flow has rightly been recognized as life stream of a successful business as there is hardly any business transaction that does not involve cash. Many research studies have revealed that profitable ventures have failed because of insufficient cash and unprofitable ones have continued for long periods because sufficient cash was somewhat pumped into the business system. Consequently, management of cash has emerged as a strategic area for the growth and prosperity of firms in contemporary business, and therefore, has received considerable attention of both academicians and practitioners. Recognizing the significance of management of cash in contemporary business as a strategic resource, business firms need to control and monitor cash flows efficiently and effectively so that adequate cash is available to meet the requirements of the business. To attain this objective, business firms make use of cash flow statement which provides them the details about cash received and spent on various activities during the period under study.

11.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning and uses of cash flow statements
- Discuss the limitations of cash flow statements and sources and uses of cash
- Describe the preparation of cash flow statement

11.2 MEANING, USES, LIMITATIONS, SOURCES AND USES OF CASH

In this section, we will learn about the meaning and uses of cash flow statement.

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Meaning

Cash flow statement attempts to measure the inflows and outflows of cash that result from various business activities during a particular accounting period. In cash flow analysis, attempts are made to explain the causes of change in the cash position of a concern during the period. Such an analysis help the business firms in identifying the areas of business that either have surplus or deficit cash and accordingly help them in the creation and utilization of cash effectively. Thus, cash flow statement is a tool that managers utilize to evaluate their ability to manage cash efficiently and effectively. Therefore, a cash flow statement focuses on cash rather than on working capital as advocated by a fund flow statement. The Institute of Cost and Works Accountants of India, 2000 defines cash flow statement as '*a statement setting out the flow of cash under distinct heads of sources of funds and their utilization to determine the requirements of cash during the given period and to prepare for its adequate provision*'.

As per professor MA Sahaf, *a cash flow statement is a statement which provides a detailed explanation for the change in a firm's cash during a particular period by indicating the firm's sources and uses of cash during that period*. Such a statement is only useful for management and does not have any utility for external users.

Uses of Cash Flow Statement

A cash flow statement is a vital analytical tool that helps a financial manager in effective management of cash. As a result, the application of cash flow statement offers the following advantages to the users:

- It ensures effective planning and coordination of financial operations. The analysis of cash flow statement provides a financial manager sufficient basis to assess the position of the firm's cash that can be generated internally as against the total amount of cash required to meet future obligations of the concern. With the result, proper arrangements can be made well in advance for the availability of adequate cash if the future cash requirements of the business cannot be met internally.
- A comparison of the cash flow statement with the projected cash flow statement is very useful in evaluating cash forecasting.
- It may be an useful tool for the proper allocation of the firm's cash among its various activities/divisions.

  The analysis of cash flow statement can also help the management in formulating appropriate financial policies regarding debts, credits, collections, dividends, etc.
- It helps the management in investment decisions.

- A comparative analysis of the firm's cash flow statements enables a financial manager to assess the liquidity position of the firm.
- A careful study of cash flow statement provides answer to some typical questions like why cash position of the concern is tight, in spite of high incomes or vice-versa.

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Comparison Between Cash Flow Statement and Fund Flow Statement

In fact, cash flow statement and fund flow statement do not differ much with each other as both the statements depict the same picture—transactions which result in the change of financial position during a particular accounting period. Commenting on the difference between these two statements Myer, 1961 is of the opinion that though 'these statements containing essentially the same story of financial events' have certain differences between them as summarized below:

- A fund flow statement gives a broad perspective by indicating changes in working capital whereas a cash flow statement indicates specifically the inflow and outflow of cash which is the one of the components of working capital as used in a fund flow statement. Therefore, cash flow is a narrow term as compared to fund flow.
- Fund flow analysis is governed by the mercantile system of accounting, *i.e.,* accrual basis. On the other hand, cash system of accounting is used for the preparation of cash flow statement.
- The amount of information as contained by a fund flow statement provides sufficient basis for long-range planning. In contrast, a cash flow statement tends to be more useful in short-run analysis.
- A fund flow statement attempts to identify the inflows and outflows of funds while cash flow statement is prepared with a purpose to recognize the inflows and outflows of cash.
- Under fund flow analysis, the changes in working capital items are shown in a separate statement known as 'schedule of changes in working capital' because fund flow statement fails to indicate such changes. In contrast, in cash flow analysis changes in both current and non-current accounts appear in the cash flow statement. Therefore, the preparation of a separate statement to indicate the changes in working capital components does not arise in cash flow analysis.

Concept of Cash Flow

The basic objective of cash flow analysis is to identify the business transactions technically known as *cash flow* that cause the change in the firms' cash and cash equivalents. In fact, cash flow can result either in *inflow* or *outflow* of cash and cash equivalent. Cash inflow refers to a business transaction that generates cash, and therefore, technically it is referred to as *source*. In the same

way, cash outflow refers to a business transaction that utilizes cash and therefore, technically it is known as *application*. In fact, such cash flows can result from the following three major activities of an enterprise:

- *Operating activities* include such activities that have direct impact on the enterprise's business results. Therefore, such activities either result in operating incomes or operating expenses;
- *Investment activities* refers to such activities that result in either purchase or sale of long-term assets;
- *Financial activities* include activities that are responsible for the change in the company's capital structure and therefore are concerned with the capital and debt of the business.

We will discuss these topics further in the Unit.

To meet the above-mentioned objective of cash flow analysis, one has to use the same approach that is devised to analyse funds flow (net working capital). However, such an approach would call for slight modification to make it appropriate for the analysis of cash flows. In cash flow analysis, the non-current accounts, *i.e.,* fixed assets and long-term liabilities are given the same treatment as is recommended for such items in fund flow analysis. However, the changes in current accounts (except cash) which were reflected in the schedule of changes in working capital in case of fund flow analysis are now reflected in cash flow statement along with the changes in non-current accounts. The cash flow can be determined symbolically as:

$$\Delta C = \Delta A - \Delta L$$

where

Δ = Change in   C = Cash

A = Total assets except cash   L = Total liabilities

The above equation clearly reveals that change in cash can be computed by analysing the changes that occurred in all non-current and current accounts except cash. The impact on cash position of a concern by the change in balance sheet items is given below:

Change in balance sheet items	*Impact on cash*
–Increase in current assets other than cash	Outflow of cash
–Decrease in current assets other than cash	Inflow of cash
–Increase in non-current assets	Outflow of cash
–Decrease in non-current assets	Inflow of cash
–Increase in current liabilities	Inflow of cash
–Decrease in current liabilities	Outflow of cash
–Increase in long-term liabilities	Inflow of cash
–Decrease in long-term liabilities	Outflow of cash

Sources and Application of Cash

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The major sources and uses of cash are mentioned below:

Sources of Cash

- Issue of capital
- Issue of long-term debts such as debentures
- Sale of assets
- Cash from operation
- Decrease in current assets
- Increase in current liabilities

Application of Cash

- Redemption of capital
- Purchase of fixed assets
- Repayment of long-term debt
- Cash lost in operation
- Increase in current assets
- Increase in current liabilities

Check Your Progress

1. Which accounting tool follows a cash system of accounting?
2. How does decrease in non-current asset impact cash?
3. Is the redemption of capital a source or application of cash?

11.3 PREPARATION OF CASH FLOW STATEMENT AS PER AS3

According to Accounting Standard (AS)-3, enterprises in India that have a turnover of more than ₹ 50 crore in a financial year need to prepare cash flow statement (CFS) in addition to basic financial statements *i.e.*, profit and loss account and balance sheet. Such a statement reflects the various sources from where cash was generated (inflow of cash) by an enterprise during the relevant accounting year and how these inflows were utilized (outflow of cash) by the enterprise. However, the Standard is not mandatory for small and medium scale companies. It is pertinent to mention here that the International Financial Reporting Standard (IFRS)-7 also prescribes that the enterprises must prepare a cash flow statement. Although both standards, *i.e.*, AS-3 and IAS-7, by and large prescribe the same mechanism for the preparation of cash flow statement except the treatment for bank overdraft and extraordinary items. IAS-7 mentions clearly that bank overdraft must be included in cash and cash equivalent and extraordinary items need not to be shown separately.

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In accordance with the standards, an enterprise needs to take the following steps to prepare a cash flow statement:

- Identification and calculation of cash flows from various activities like operating, investing and financing; and
- Ascertaining net change (increase/decrease) in cash and cash equivalents.

A cash flow statement basically provides information to all stakeholders on the historical changes in cash and cash equivalents during the financial period for which the basic financial statements have been prepared by the enterprise. The statement helps the users of accounts:

- To identify the historical changes in the flow of cash and cash equivalents.
- To determine the future requirement of cash and cash equivalents.
- To assess the ability to generate cash and cash equivalents.
- To estimate the further requirement of generating cash and cash equivalents.
- To compare the operational efficiency of different enterprises.
- To study the insolvency and liquidity position of an enterprise.

Since the understanding of the terms 'cash' and 'cash equivalent' are a prerequisite for the preparation of the cash flow statement, therefore, it becomes mandatory for the students of accounting to know the meaning of the terms in the context of the standard. The term 'cash' as used in this standard includes cash on hand and demand deposits with banks. The term 'cash equivalents' as referred to in this standard includes:

- Short term (maximum three months of maturity from the date of acquisition)
- Highly liquid investments
- Readily convertible
- Convertible amounts of cash is known
- Subject to an insignificant risk of changes in value

A cash flow statement is recognized as a strategic tool for the management accountants as it addresses the following vital questions:

- Where did cash come from during the period?
- What was the cash used for during the period?
- What was the change in cash balance during the period?

The standard also provides the treatment of special items like interest, dividend, taxes on income and some other special items.

Source: Adapted from Training Material, Implementation of Accounting Standard with Specific Reference to Educational Institutions, The Institute of Chartered Accountants of India, New Delhi, 2012.

Let us now discuss some of the important concepts mentioned in the Accounting Standard 3:

Operating Activities

The amount of cash flows arising from operating activities is a key indicator of the extent to which the operations of the enterprise have generated sufficient cash flows to maintain the operating capability of the enterprise, pay dividends, repay loans and make new investments without recourse to external sources of financing. Information about the specific components of historical operating cash flows is useful, in conjunction with other information, in forecasting future operating cash flows.

Cash flows from operating activities are primarily derived from the principal revenue-producing activities of the enterprise. Therefore, they generally result from the transactions and other events that enter into the determination of net profit or loss. Examples of cash flows from operating activities are:

(a) cash receipts from the sale of goods and the rendering of services;

(b) cash receipts from royalties, fees, commissions and other revenue;

(c) cash payments to suppliers for goods and services;

(d) cash payments to and on behalf of employees;

(e) cash receipts and cash payments of an insurance enterprise for premiums and claims, annuities and other policy benefits;

(f) cash payments or refunds of income taxes unless they can be specifically identified with financing and investing activities; and

(g) cash receipts and payments relating to futures contracts, forward contracts, option contracts and swap contracts when the contracts are held for dealing or trading purposes.

Some transactions, such as the sale of an item of plant, may give rise to a gain or loss which is included in the determination of net profit or loss. However, the cash flows relating to such transactions are cash flows from investing activities.

An enterprise may hold securities and loans for dealing or trading purposes, in which case they are similar to inventory acquired specifically for resale. Therefore, cash flows arising from the purchase and sale of dealing or trading securities are classified as operating activities. Similarly, cash advances and loans made by financial enterprises are usually classified as operating activities since they relate to the main revenue-producing activity of that enterprise.

Investing Activities

The separate disclosure of cash flows arising from investing activities is important because the cash flows represent the extent to which expenditures have been made for resources intended to generate future income and cash flows. Examples of cash flows arising from investing activities are:

(a) cash payments to acquire fixed assets (including intangibles). These payments include those relating to capitalized research and development costs and self-constructed fixed assets;

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(b) cash receipts from disposal of fixed assets (including intangibles);

(c) cash payments to acquire shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than payments for those instruments considered to be cash equivalents and those held for dealing or trading purposes);

(d) cash receipts from disposal of shares, warrants or debt instruments of other enterprises and interests in joint ventures (other than receipts from those instruments considered to be cash equivalents and those held for dealing or trading purposes);

(e) cash advances and loans made to third parties (other than advances and loans made by a financial enterprise);

(f) cash receipts from the repayment of advances and loans made to third parties (other than advances and loans of a financial enterprise);

(g) cash payments for futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the payments are classified as financing activities; and

(h) cash receipts from futures contracts, forward contracts, option contracts and swap contracts except when the contracts are held for dealing or trading purposes, or the receipts are classified as financing activities.

When a contract is accounted for as a hedge of an identifiable position the cash flows of the contract are classified in the same manner as the cash flows of the position being hedged.

Financing Activities

The separate disclosure of cash flows arising from financing activities is important because it is useful in predicting claims on future cash flows by providers of funds (both capital and borrowings) to the enterprise. Examples of cash flows arising from financing activities are:

(a) cash proceeds from issuing shares or other similar instruments;

(b) cash proceeds from issuing debentures, loans, notes, bonds, and other short or long-term borrowings; and

(c) cash repayments of amounts borrowed.

Cash equivalents

These are held for the purpose of meeting short-term cash commitments rather than for investment or other purposes. For an investment to qualify as a cash equivalent, it must be readily convertible to a known amount of cash and be subject to an insignificant risk of changes in value. Therefore, an investment normally qualifies as a cash equivalent only when it has a short maturity of, say, three months or less from the date of acquisition. Investments in shares are excluded from cash equivalents unless they are, in substance, cash equivalents; for example, preference

shares of a company acquired shortly before their specified redemption date (provided there is only an insignificant risk of failure of the company to repay the amount at maturity).

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Other Important Standards Include:

- An enterprise should report separately major classes of gross cash receipts and gross cash payments arising from investing and financing activities, except to the extent that cash flows described under reporting of Cash Flow on a net basis.
- Cash flows arising from the following operating, investing or financing activities may be reported on a net basis: (a) cash receipts and payments on behalf of customers when the cash flows reflect the activities of the customer rather than those of the enterprise; and (b) cash receipts and payments for items in which the turnover is quick, the amounts are large, and the maturities are short.
- Cash flows arising from each of the following activities of a financial enterprise may be reported on a net basis: (a) cash receipts and payments for the acceptance and repayment of deposits with a fixed maturity date; (b) the placement of deposits with and withdrawal of deposits from other financial enterprises; and (c) cash advances and loans made to customers and the repayment of those advances and loans.
- Cash flows arising from transactions in a foreign currency should be recorded in an enterprise's reporting currency by applying to the foreign currency amount the exchange rate between the reporting currency and the foreign currency at the date of the cash flow. A rate that approximates the actual rate may be used if the result is substantially the same as would arise if the rates at the dates of the cash flows were used. The effect of changes in exchange rates on cash and cash equivalents held in a foreign currency should be reported as a separate part of the reconciliation of the changes in cash and cash equivalents during the period.
- The cash flows associated with extraordinary items should be classified as arising from operating, investing or financing activities as appropriate and separately disclosed.
- Investing and financing transactions that do not require the use of cash or cash equivalents should be excluded from a cash flow statement. Such transactions should be disclosed elsewhere in the financial statements in a way that provides all the relevant information about these investing and financing activities.
- An enterprise should disclose the components of cash and cash equivalents and should present a reconciliation of the amounts in its cash flow statement with the equivalent items reported in the balance sheet.
- An enterprise should disclose, together with a commentary by management, the amount of significant cash and cash equivalent balances held by the enterprise that are not available for use by it.

NOTES

Calculation of Cash from Operations

The major source of cash for a business is cash from trading operations. When the accounting system is based on cash system, the net profit as shown by profit and loss represents the cash from operations. However, in actual practice, commercial organizations maintain mercantile system of accounting. With the result the profit as disclosed by profit and loss account is not considered the actual cash from operation as it includes many transactions of notional cash. Thus, net profit as shown in profit and loss account is to be adjusted as to arrive at actual cash from operation. The non-cash transactions like outstanding incomes/ expenses, prepaid expenses, etc., should be adjusted. Further all non-fund items such as depreciation, preliminary expenses written off, etc., are also to be adjusted as is done in case of fund flow statement. A detailed proforma of the statement showing computation of cash from operations is given below:

Statement Showing Computation of Cash from Operations

Particulars	*Amount* (₹)
Net profit (as given in P&L A/c)	
Add:	
(a) *Decrease in Current Assets:*	
Sundry debtors	
Bill receivable	
Prepaid expenses	
Accrued income	
(b) *Increase in Current Liabilities:*	
Sundry creditors	
Bills payable	
Outstanding expenses	
Income received in advance	
(c) *Non-fund items debited to Profit and Loss Account:*	
Depreciation	
Goodwill written off	
Loss on sale of assets	
Preliminary expenses written off	
Less:	
(a) *Increase in Current Assets:*	
Sundry debtors	
Bill receivable	
Prepaid expenses	
Accrued income	
(b) *Decrease in Current Liabilities:*	
Sundry creditors	
Bill payable	
Outstanding expenses	
Income received in advance	
(c) *Non-fund items credited to Profit and Loss Account:*	
Profit on sale of assets	
Cash from operations	

Note: The current assets and current liabilities will not include cash balances and bank overdraft respectively in the determination of cash from operations.

Illustration 11.1 From the following balance sheet of M/s S.B. Company Ltd., as on Dec. 31, 2010 and 2011, calculate cash from operation:

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Liabilities	*2010* (₹)	*2011* (₹)	*Assets*	*2010* (₹)	*2011* (₹)
Share capital	1,20,000	1,50,000	Building	65,000	65,000
P&L A/c	45,000	65,000	Machinery	90,000	1,20,000
Sundry creditors	30,000	22,000	Stock	20,000	15,000
Outstanding expenses	1,200	400	Sundry debtors	18,000	20,000
Bill payable	18,000	22,000	Cash at bank	17,000	32,300
			Cash in hand	4,200	7,100
	2,14,200	2,59,400		2,14,200	2,59,400

Solution

Calculation of Cash from Operation

			(₹)
Net profits as given (65,000 – 45,000)			20,000
Add:			
(a) Decrease in Current Assets:			
Stock		5,000	
(b) Increase in Current Liabilities:			
Bills payable		4,000	9,000
			29,000
Less:			
(a) Increase in Current Assets:			
Sundry debtors		2,000	
(b) Decrease in Current Liabilities:			
Sundry creditors	8,000		
Outstanding expenses	800	8,800	
			10,800
Cash from Operations			18,200

Methods of Reporting Cash Flows from Operating Activities: Direct and Indirect

An enterprise should report cash flows from operating activities using either:

(a) the direct method, whereby major classes of gross cash receipts and gross cash payments are disclosed; or

(b) the indirect method, whereby net profit or loss is adjusted for the effects of transactions of a non-cash nature, any deferrals or accruals of past or future operating cash receipts or payments, and items of income or expense associated with investing or financing cash flows.

NOTES

The direct method provides information which may be useful in estimating future cash flows and which is not available under the indirect method and is, therefore, considered more appropriate than the indirect method. Under the direct method, information about major classes of gross cash receipts and gross cash payments may be obtained either:

(a) from the accounting records of the enterprise; or

(b) by adjusting sales, cost of sales (interest and similar income and interest expense and similar charges for a financial enterprise) and other items in the statement of profit and loss for:

i) changes during the period in inventories and operating receivables and payables;

ii) other non-cash items; and

iii) other items for which the cash effects are investing or financing cash flows.

Under the indirect method, the net cash flow from operating activities is determined by adjusting net profit or loss for the effects of:

(a) changes during the period in inventories and operating receivables and payables;

(b) non-cash items such as depreciation, provisions, deferred taxes, and unrealized foreign exchange gains and losses; and

(c) all other items for which the cash effects are investing or financing cash flows.

Alternatively, the net cash flow from operating activities may be presented under the indirect method by showing the operating revenues and expenses excluding non-cash items disclosed in the statement of profit and loss and the changes during the period in inventories and operating receivables and payables.

Forms of Cash Flow Statement

A cash flow statement can be prepared in two forms:

(i) Report Form, and

(ii) Account Form.

The format of a cash flow statement (Report Form) is given below:

Cash Flow Statement for the Period Ending

Particulars	*Amount* (₹)
Balances at the Beginning: Cash in hand Cash at bank	

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Add: *Cash Inflows:*	
Issue of share capital	
Issue of debentures	
Long-term loans	
Sale of fixed assets	
Cash from operations	
Less: *Cash Outflows:*	
Redemption of share capital	
Redemption of debentures	
Payment of long-term debts	
Purchase of fixed assets	
Non-trading payments e.g, dividends, taxes, etc.	
Cash lost in operations	
Balances at the end	
Cash in hand	
Cash at bank	

Alternatively, it may be shown in an account form as follows:

Cash Flow Statement for the Period Ending

Sources	*Amount* (₹)	*Application* (₹)	*Amount* (₹)
Balance in the Beginning:		Cash Outflows:	
Cash in hand		Redemption of share capital	
Cash at bank		Redemption of debentures	
Add: Cash Inflows:		Payment of long-term debts	
Issue of share capital		Purchase of fixed assets	
Issue of debentures		Non-trading payments	
Long-term loans		Cash lost in operation	
Sale of fixed assets		Balance at the end:	
Cash from operations		Cash in hand	
		Cash at bank	

Illustration 11.2 Prepare cash flow statement from the comparative balance sheet of S. B. Company Ltd. as given in Illustration 11.1.

Solution

Cash Flow Statement

for the period ending December 31, 2011

Particulars		(₹)
Balances at Beginning:		
Cash in hand	4,200	
Cash at bank	17,000	21,200
Add: Cash inflows		
Issue of share capital	30,000	
Cash from operation	18,200	48,200
		69,400
Less: Cash outflows:		
Machinery	30,000	30,000
Balance at the End:		
Cash in hand	7,100	
Cash at bank	32,300	39,400

Adjustment of Typical Items

The treatment of the typical items like depreciation, dividend, profit on sale of assets, etc., in the cash flow analysis is the same as is recommended for such items in the fund flow analysis. However, the provision for taxation is treated as a non-current item. The actual amount of tax paid during the year is shown in the cash flow statement as cash outflow. The current provision of taxation is added back to the amount of profit in order to ascertain cash from operation.

Preparation of Working Accounts and Notes (Hidden Transaction)

The preparation of working accounts and notes is as important in cash flow analysis as is in case of fund flow analysis. The procedure for ascertaining the hidden information is the same as is devised in the case of fund flow analysis.

Illustration 11.3 The following schedule shows balance sheets in con-densed form of ESS EMM Co. Ltd., at the beginning and end of the year 2011.

Liabilities	*1-1-2011* (₹)	*31-12-2012* (₹)	*Assets*	*1-1-2011* (₹)	*31-12-2012* (₹)
Sundry creditors	55,000	83,000	Cash balances	25,000	18,000
Bills payable	20,000	16,000	Sundry debtors	1,60,000	2,00,000
Provision for tax	40,000	50,000	Bills receivable	20,000	30,000
Proposed dividend	42,000	50,000	Stock in trade	77,000	1,09,000
6% Debentures	1,50,000	1,00,000	Machinery	80,000	2,00,000
General reserve	40,000	70,000	Building	2,00,000	1,70,000
Profit and loss account	30,000	48,000	Goodwill	1,15,000	90,000
Capital	3,00,000	4,00,000			
	6,77,000	8,17,000		6,77,000	8,17,000

The following information concerning the transactions is available:

(i) An interim dividend of ₹ 20,000 was paid in 2011.

(ii) Depreciation of ₹10,000 and ₹ 20,000 have been charged on Machinery and Building respectively in 2011.

(iii) Income-tax ₹ 35,000 was paid during the year.

Solution

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Calculation of Cash from Operations

			(₹)
Net profits as given (48,000 – 30,000)			18,000
Add:			
(a) Increase in Current Liabilities:			
Sundry creditors		28,000	28,000
(b) Non-fund items Debited to P&L A/c:			
Goodwill		25,000	
Depreciation:			
Machinery	10,000		
Building	20,000	30,000	
Proposed dividend		50,000	
Interim dividend		20,000	
Provision for tax		45,000	
General reserve		30,000	2,00,000
			2,46,000
Less:			
(a) Increase in current assets:			
Sundry debtors	40,000		
Stock in trade	32,000		
Bills receivable	10,000	82,000	
(b) Decrease in current liabilities:			
Bills payable	4,000	4,000	86,000
Cash from Operations			1,60,000

Statement of Sources and uses of Cash

		(₹)
Cash Balance at the Beginning:		25,000
Add: Cash Inflows:		
Issue of share capital	1,00,000	
Cash from operation	1,60,000	
Sale of building	10,000	2,70,000
		2,95,000
Less: Cash Outflows:		
Redemption of debentures	50,000	
Purchase of machinery	1,30,000	
Payment of dividend	42,000	
Payment of interim dividend	20,000	
Payment of tax	35,000	2,77,000
Cash balance at the end		18,000

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Working Notes:

Provision for Tax Account

	(₹)		(₹)
To Tax paid	35,000	By Balance b/d	40,000
To Balance c/d	50,000	By P&L A/c (balancing figure)	45,000
	85,000		85,000

Machinery Account

	(₹)		(₹)
To Balance b/d	80,000	By Depreciation	10,000
To Purchases (balancing figure)	1,30,000	By Balance c/d	2,00,000
	2,10,000		2,10,000

Building Account

	(₹)		(₹)
To Balance b/d	2,00,000	By Depreciation	20,000
		By Balance c/d	1,70,000
		By Closing balance (Sale of building)	10,000
	2,00,000		2,00,000

Check Your Progress

4. List the two steps required to prepare a cash flow statement as per AS 3.
5. Which category of activities comprise of option and swap contracts?
6. Define direct method.
7. Mention the accounting treatment of provision for taxation in the cash flow statement.

11.4 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. Cash flow statement is the accounting tool which used the cash system of accounting.
2. Decrease in non-current assets results in inflow of cash.
3. Redemption of capital is an application of cash.
4. The two steps required to prepare a cash flow statement are: (i) identification and calculation of cash flows from various activities and ascertaining net change in cash and cash equivalents.
5. Option contracts and swap contracts fall under the category of investing activities.
6. The direct method is a method of reporting cash flows from operating activities whereby major classes of gross cash receipts and gross cash payments are disclosed.

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7. The provision for taxation in cash flow statement is treated as a non-current item. The actual amount of tax paid during the year is shown in the cash flow statement as cash outflow. The current provision of taxation is added back to the amount of profit in order to ascertain cash from operation.

11.5 SUMMARY

- A cash flow statement is a statement which provides a detailed explanation for the change in a firm's cash during a particular period by indicating the firm's sources and uses of cash during that period.
- Cash flow statement is governed by the cash system of accounting.
- The basic aim of cash flow analysis is to determine what transactions caused the cash balance to change during a particular period.
- Cash flow statement is governed by the cash system of accounting.
- To determine cash flow, the non-current accounts i.e., fixed assets and long term liabilities are analysed as before, and changes in current accounts except cash are also analysed.
- The change in cash can be computed by analysing change that occurred in all non-current and current accounts except cash.
- The major source of cash for a business is cash from trading operations.
- A cash flow statement is a vital analytical tool in the hand of financial manager that helps him in the proper management of cash.
- A comparative analysis of the firm's cash flow statements enables a financial manager to assess the liquidity position of the firm.
- A careful study of cash flow statement provides answer to some typical questions like why cash position of the concern is tight, in spite of high incomes or vice-versa.

11.6 KEY WORDS

- **Cash flow statement:** It is a statement which attempts to measure the inflows and outflows of cash that result from various business activities during a particular accounting period.
- **Operating activities:** It refers to such activities that have direct impact on the enterprise's business results.
- **Investment activities:** It refers to such activities that result in either purchase or sale of long-term assets.
- **Financial activities:** It includes activities that are responsible for the change in the company's capital structure.

- **Cash from operations:** It is the net profit as shown by profit and loss, when the accounting system is based on cash system.

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11.7 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. Define the concept of 'Cash Flow'. List the objectives of cash flow analysis.
2. What is the difference between funds flow and cash flow statement?
3. Write short notes on:
   (a) Notional cash and (b) Non-cash items.
4. Draw a cash flow statement with the help of imaginary figures.
5. Explain the major sources and application of cash with examples.
6. What is the utility of preparing cash flow statement?

Long Answer Questions

1. Explain the procedure of preparing a cash flow statement.
2. Discuss the procedures of ascertaining cash from operation as required for the preparation of a cash flow statement.
3. Following are the comparative balance sheets of IQRA Ltd.

Liabilities	*2011* (₹)	*2012* (₹)	*Assets*	*2011* (₹)	*2012* (₹)
Share capital	1,80,000	1,90,000	Cash	60,000	40,000
Sundry creditors	64,000	76,000	Sundry debtors	1,55,000	1,90,000
Profit and loss A/c	29,000	35,600	Land and building	50,000	62,000
			Patent rights	8,000	9,000
	2,73,000	3,01,000		2,73,000	3,01,000

Prepare a Cash Flow Statement.

4. Super Max Co. Ltd. wants to prepare a 'Cash Flow' statement for the year ended December 31, 2012, from the details given below:

(a) Income statement for the year ended 31-12-2012

Sales	29,000
Cost of sales	19,900
Tax provision	2,500
Dividend provided	1,600

(b) **Balance Sheets**

Liabilities	*2011* (₹)	*2012* (₹)	*Assets*	*2011* (₹)	*2012* (₹)
Capital	8,000	8,000	Fixed assets (Gross)	12,000	18,500
Reserves and supplies	6,000	11,000	Depreciation	(3,500)	(5,500)
Bank loan (long-term)	4,000	6,000	Inventory	8,000	7,000
Current liabilities	3,000	5,200	Accounts receivable	4,000	6,800
Dividend provided	–	1,600	Cash	500	5,000
	21,000	31,800		21,000	31,800

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11.8 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

BLOCK - IV
CAPITAL BUDGETING & DIVIDEND POLICY

NOTES

UNIT 12 CAPITAL BUDGETING

Structure

12.0 INTRODUCTION

The decisions regarding the procurement of fixed assets not only have strategic implications for any business but also involve huge initial investment. Since the investment in such assets is usually of substantial magnitude and the benefits or services received in the form of cash flows *from* their acquisition usually extend over a fairly long period of time, companies need to pay serious attention over the budgeting of such expenditures. For a big commercial enterprise, it may entail millions of rupees spent annually on infrastructure facilities whereas for a smaller commercial concern, it might entail the occasional purchase for one machine costing several thousands of rupees. Extensive research and analysis are required to aid the management in making a decision to commit these large sums which it is assumed will be returned in greatly reduced installments over many accounting periods. In fact, the success of any commercial enterprise depends largely upon efficient utilization of the fixed assets. Consequently, such decisions are subject to a systematic evaluation process which is known as *capital budgeting*.

12.1 OBJECTIVES

After going through this unit, you will be able to:

- Discuss the nature, elements and objectives of capital budgeting.
- Mention the kinds of capital proposals.

- Explain methods and techniques of evaluating projects
- Discuss capital rationing.

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12.2 CAPITAL BUDGETING: MEANING AND PRINCIPLES

Capital expenditure decisions are not only recognized as being most critical for the success of business but also subject to a systematic evaluation process technically referred to as capital budgeting. Capital budgeting refers to the practice of allocating money, on a regular basis, to be used for acquiring capital assets. It is a decision making process used by firms to analyse the purchase of major fixed assets which may include both tangible assets like building, machinery, plant and equipment and intangible assets like technology, patents and trademarks. Commenting on the nature and scope of capital budgeting, Bierman and Smidt (2006), state that capital budgeting is *a many-sided activity that includes searching for new and more profitable investment proposals, investigating engineering and marketing considerations to predict the consequences of accepting the investment, and making economic analyses to determine the profit potential of each investment proposal*. Thus, capital budgeting is concerned with the process of planning and controlling major expenditure on projects with lives extending beyond one year.

As per professor MA Sahaf, capital budgeting is *a process of long-range planning expenditure for acquiring such assets which not only require significant investment but also generate cash flows beyond one year. It is investment decision making that aims to evaluate the financial desirability of a project with the help of cash flows rather than net income as advocated by accrual accounting.* Capital budgeting is primarily the planning and control of expenditure for capital assets, such as:

- replacement of existing assets to meet growing demands of the changing environment in general and competition in particular;
- acquisition of new equipment, building or facilities with the aim to expand existing operations;
- developing new types of production methods and technologies like automating production system;
- responding to some change in legal, operating and safety environment; and
- developing the firm's commercial websites.

Principles of Capital Budgeting

The following principles of capital budgeting must be kept in mind:

- Actual cash flows and not accounting income should be considered for capital budgeting. Sunk costs are to be excluded and externalities to be included.

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- Time value of money is important and therefore the timing of the cash flow is crucial. The cash flow received earlier is more important than one received later.
- Opportunity costs are considered while evaluating cash flows.
- Tax expenses are not be included in the value of the cash flow.
- Since financial costs are already counted in cost of capital, these are ignored to avoid the problem of double counting.

Why Capital Budgeting?

Although the high quantum of investment accompanied by higher risk in capital projects are generally advocated as the basic reasons for the application of the capital budgeting process, yet *Moore* and *Jaedicke* (1980), state that capital investment decisions call for increased attention of the firms because:

- substantial sums of money are usually invested in capital projects;
- the resources that are invested in a project are often committed for a long period of time;
- it may be difficult to reverse the effects of a poor decision;
- the success or failure of the company may depend upon a single or relatively few investment decisions;
- plans must be made well into an uncertain future.

12.2.1 Steps in Capital Budgeting Process

A systematic process of capital budgeting consists of the following five steps.

1. Inviting Investment Proposals

The capital budgeting process begins with invitation of proposals from various departments of the organization. The step, in fact, provides organizations the opportunities for investment. Project proposals need to be designed in tune with a firm's strategic plan to ensure a perfect match between corporate objectives and intended outcome of the proposals. In fact, investment opportunities created by the project proposals must contribute to a firm's corporate goals. Such a contribution would help the organization to assess the strategic significance of the investment. To have sufficient and effective project proposals, a firm must encourage, appreciate and reward the departments to submit project proposals that are effective both strategically and profitably.

2. Project Review and Analysis

This step involves preliminary project screening and financial and commercial viability of the projects. The number of project proposals received from the departments is usually much higher than a firm's available resources for investment. Due to limited resources, it is not possible for a firm to consider all identified

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projects for investment. Consequently, a firm needs to devise some criterion that would help a firm in identifying the most viable proposals for investment. The criterion generally used for this purpose is based on quantitative measures which are highly influenced by the evaluators' judgements based on their intuitive feeling and experience. Once the project qualifies the preliminary screening process, it is subject to financial analysis which examines the potential of an investment in contributing to the performance of a firm. The techniques used for such an analysis have been discussed in the later section of this unit. However, the financial analysis involves quantitative analysis to predict future cash flows from the projects. The process of forecasting cash flows is considered crucial for investment decision making process.

3. Decision Making

The third step in the process will be decision making. On the basis of the nature and scope of capital projects, a firm may have to deal with the following three types of decisions:

- ***Mutually Exclusive Project Decision*** In many business situations, a firm needs to choose one appropriate alternative among two or more alternatives associated with a capital project. For example, a university may have to choose between conventional and e-admission systems for enrolling the students in its MBA programme with different cost structures and resources. The decision of the university to admit students for the programme through one system would eliminate the use of the other system. Both the systems may be effective and efficient in their own ways but the university can't accept both. The university needs to choose one that in its opinion is the most efficient and effective. Such situations fall within the scope of *mutually exclusive projects* where a firm has to choose one of the several alternatives projects. In case of such projects, the firms need to rank projects in terms of their defined criteria for the purpose so that the most appropriate project is identified and selected.
- ***Independent Project Decision*** It may not be uncommon for firms to find such situations where the choice of one project does not eliminate the possibility of acceptance of another; as such projects do not compete with each other. Such projects are technically referred to as *independent projects*. For example, a university may be considering proposals to establish its campuses in all different states of northern India. It could choose to establish campuses either in all the states of northern India, or to some states, or to none. Such projects, in fact advocate the philosophy of the *accept-reject approach* to making decisions. The decision makers would accept all proposals that could meet their objectives and reject the ones that fail to do so.
- ***Capital Rationing Decision*** Although independent projects are not mutually exclusive, yet firms may have to rank them for the purpose of

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capital rationing. Generally, firms have more proposals for capital investments than they actually can finance. Consequently, they have to rank the capital investment proposals with an aim to identify the most profitable ones that can be actually financed from available resources. The process used for the purpose, technically referred to as **capital rationing,** actually ranks the projects on the basis of predetermined rate of return.

4. Project Implementation

After the project has qualified evaluation stage, it needs to be implemented. This involves expenditures that are incurred for the execution of the project. The implementation of the project may call for the active participation of various functional departments of a firm. A firm must monitor implementation of the project constantly with an aim not only to identify operational problems but also to suggest solutions for such problems.

5. Post-Implementation Audit

The last step in the capital budgeting process involving evaluation of the performance of the project after its implementation. This step helps a firm not only to assess the success of project implementation but also to help future planning and strategy.

Kinds of Proposals

Capital budgeting process includes several different proposals. It differs from firm to firm. However, the most common ones are:

- expansion;
- replacement;
- choice of equipment; and
- buy or lease.

Check Your Progress

1. How does the process of capital budgeting begin?
2. What are mutually exclusive project decisions?

12.3 METHODS OF EVALUATING PROJECTS

Different approaches are used for evaluating relative worth of alternative investment projects which include both qualitative and quantitative analysis. Qualitative analysis may recognize non-monetary factors like social benefits, quality, safety, flexibility, and the like in the evaluation of capital proposals. Quantitative analysis determines the worth of investment projects on the basis of monetary factors like investment, rate of return, economic life, income tax, etc. To deal with this rather mixed situation, commercial concerns utilize one of the sound approaches for determining the relative

or absolute profitability of all capital proposals that are up for consideration. Having made these computations, proposals are listed in the descending order of profitability.

NOTES

Many different techniques have been developed to help executives in the evaluation of capital projects. Such techniques range from those that represent rough approximations to those that are relatively precise. Some techniques take the time value of money into account while others ignore it in the process of evaluation. The methods that do not take the time value of money into account are simple to use because they do not involve present value computation. Accordingly, evaluation techniques can be broadly classified into two general categories, namely:

Non-discounted cash flow methods

- payback
- payback reciprocal and
- accounting rate of return.

Discounted cash flow methods

- net present value
- internal rate of return and
- profitability index.

Non-discounted Cash Flow Method

Payback Method Payback method which is not only one of the oldest methods but also most popular method of evaluating investment proposals involves the calculation of the span of time required to recover initial cash investment. In fact, it determines the payback period which is the length of time that elapses before total cumulative cash inflows (after tax before depreciation) from the project equal the initial cash outlays for the project. The formula for the payback period is as under:

$$\text{Payback period} = \frac{\text{Cost of investment}}{\text{Annual cash inflows}}$$

Thus, the computation of payback period requires information like initial cost of the project (investment) and net cash inflows from the investment. The net cash inflows represent the amount of profit after tax but before depreciation.

Assume that investment (project cost) of ₹ 4,00,000 is expected to produce annual returns (cash inflows) of ₹ 50,000 for ten years. No salvage recovery is expected from the investment at the end of the ten years. The initial investment will be recovered in eight years, as calculated below:

$$\text{Payback period} = \frac{\text{Investment (Cost of project)}}{\text{Annual cash inflows}}$$

$$= \frac{4,00,000}{50,000} = 8 \text{ years}$$

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In the above example, cash inflows were evenly distributed over time. However, with non-uniform cash inflows, the computation of the payback period is somewhat different though the concept is the same. The example given below will clear the concept and calculation of payback period when the cash inflows are unevenly distributed over time.

Example Suppose a firm has two projects to be considered by it. Each involves an initial investment of ₹ 40,000. The annual cash inflow expected from investment *Y* and *Z* are shown in Table 12.1

Table 12.1

Years	***Net Cash Flows from Investment***	
	***Y* (₹)**	***Z* (₹)**
1	4,000	20,000
2	6,000	18,000
3	10,000	12,000
4	12,000	10,000
5	12,000	8,000
6	15,000	6,000
7	20,000	5,000

Table 12.1 reveals that project *Y* gives a return of ₹ 32,000 in the first four years which is ₹ 8,000 short of the original investment. From the cash inflows of the fifth year, only ₹ 8,000 are needed to recover the investment. Therefore, ₹ 32,000 from the first four years plus 8,000/12,000 from the fifth year is required. The payback period is 4 years and 8* months for the project *Y*. In the same way, the payback period for the project *Z* can be computed. In this project the first 2 years can yield net cash inflows of ₹ 38,000 which is deficit by ₹ 2,000 from the original investment. In the third year, out of cash inflows of ₹ 12,000, first ₹ 2,000 are required to recover initial investment. Therefore, ₹ 38,000 form the first two years plus 2,000/12,000 from the third year are required. Thus, the payback period is 2 years and 2** months for the project *Z*.

In the above-mentioned examples, the projects were without the salvage value and therefore, there was no scope for salvage value in the computation of payback period. However, if the project is with salvage value and the same is considered in the determination of payback period, the process is known as *bailout*. Bailout is a method of determining the length of time that will be required for cash inflows and salvage value of the project to recoup the funds invested in a proposed project. This concept is based on the logic that a proposed project has a salvage value at the expiry of the project and, therefore, a due consideration must be given to this value in the evaluation of capital projects. In fact, it is an extension of the payback method.

The payback method suggests the ranking of projects according to the length of time they take to pay back their initial costs. In fact, the management decides beforehand the maximum payback period, *i.e.*, *'cut-off period'*, beyond which a project is rejected. *Cut-off period* denoted the risk tolerance level in the firm. A project with a short payback period involves less risk than the one with a longer payback. Therefore, management always prefers to accept projects with quick payback because the short payback period in relation to the economic life would also indicate high profitability of a project. However, it is not always true because sometimes projects with shorter payback periods may be less profitable as compared to longer payback projects.

Another glaring weakness of the payback period as a device for evaluating investment is that it fails to consider whether the cash inflows are unevenly distributed over time. This method also does not take into account the time value of money. This lapse can be bridged by an improved method of payback technique—*'Discounted payback method'* which recognizes the time period required to equate cumulated present value of cash inflows with the present value of cash outflows in the evaluation of capital projects. It considers the amount of time required to convert the net present value of a project from negative to positive rather than the time required to recover the actual investment of the project. The period where the net present value of the project's cash flows amounts to zero is known as the *break-even period*. The period up to break-even period is the *'discounted payback period'*. The break-even period becomes the evaluation criterion for the selection of the projects. The projects with shorter discounted payback period are preferred.

Further, no consideration is given to cash inflows after the payback date under payback method. As a result, it hammers capital projects that yield small cash inflows in their early years and heavy cash inflows in their later years. However, to overcome this, drawback experts have developed a special device known as *'post payback profitability index'* which is a ratio between post payback profits and investment. The project with higher ratio is considered commercially more viable. Another limitation of the payback period method is to decide about cut-off period. Most of these criticism stem from the emphasis that the payback method places on liquidity rather than profitability; this character is its primary weakness (Rosell and Frasure, 1980).

Nevertheless, the utter simplicity of the payback period method makes it attractive to many persons, particularly non-financial people.

Payback Reciprocal This method attempts to estimate the internal rate of return. The payback reciprocals are calculated by dividing annual cash inflow by the amount of investment. This method is considered suitable only if the life of the project is at least twice the payback period. To be more accurate, the payback reciprocal should be used only for such projects that generate uniform cash inflows. This is because non-uniform cash flows may cause the payback reciprocal to be a

very poor estimate of the internal rate of return which is used as measuring yard for the evaluation of the project under this method.

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Accounting Rate of Return Accounting rate of return method also known as the *financial statement method, the book value method, the unadjusted rate of return method* is consistent with the accounting measurements of income by using accounting records. It is based on the traditional concepts of accounting income and return on investment. Under this method, the evaluation of the project is done on the basis of rate of return. The rate of return on investment may be computed by several different methods yielding somewhat different results. The most common among them are:

- *Average rate of return on original investment:* This method is perhaps the simplest and most common method used by small firms. In this method, the average rate of return is simply calculated by dividing average earnings after depreciation and tax from the investment by total investment.

Illustration 12.1 A project which costs ₹ 1,20,000 is expected to yield total earnings after depreciation and tax of ₹ 60,000 over 3 years. The scrap value of the project after 3 years has been calculated as ₹ 20,000. Calculate the average rate of return on the investment.

Solution

Average earning (after depreciation and tax) $= \frac{60,000}{3}$

= ₹ 20,000

Total investment in the project = ₹ 1,20,000 – 20,000 (Scrap value)

= ₹ 1,00,000

$$\text{Average rate of return} = \frac{\text{Average annual earnings}}{\text{Total investment}} \times 100$$

$$= \frac{20,000}{1,00,000} \times 100$$

$$= 20\%$$

- *Average rate of return on average investment:* In this method, instead of original investment, average investment is used for determining rate of return on investment. The philosophy for the use of average investment is that as time passes and assets depreciate, the book value of the projects declines. Therefore, the amount of investment for determining rate of return should be average investment which is obtained by adding the beginning and ending value and diving the same by two. Thus,

$$\text{Average rate of return} = \frac{\text{Average annual earnings}}{\text{Total investment}} \times 100$$

NOTES

Illustration 12.2 Calculate average rate of return on average investment by using the data given in Illustration 12.1:

$$\text{Average rate of return} = \frac{20,000}{70,000} \times 100$$
$$= 29\% \text{ App.}$$

Working:

Calculation of average investment:

$$= \frac{\text{Original investment + Scrap value}}{2}$$
$$= \frac{1,20,000 + 20,000}{2}$$
$$= \frac{1,40,000}{2} = ₹\ 70,000$$

The results of the above two illustrations, clearly reveal that there is significant variation in the accounting rate of return with the change in the investment base. However, this does not mean that one method is superior to the other. Each investment base is suitable for a particular business decision. Therefore, management should use the investment base which it finds most appropriate for the purpose. Firms prefer to use rate of return method for evaluating capital projects as they find required data readily available from financial statements for evaluation. Further, this technique considers entire earnings of a project rather than earning up to the payback period. At the same time, the accounting rate of return is easy to operate and simple to understand because executives find it closely parallel to the traditional concepts of income analysis and investment return. However, the accounting rate of return method is weak in that it fails to consider the time value of money by treating each future rupee of income as equivalent to the rupee invested or earned presently. Another weakness of this method is that no consideration is given to cash inflows that may be associated with a project.

Discounted Cash Flow (Time-adjusted) Method

The discounted cash flows method deals with actual cash flow instead of the accounting concept of income. It recognizes the time value of money and claims that a rupee in hand today possesses more worth than a rupee to be received in future. The amount of money to be received in the future is not equivalent to the same amount of money held at the present time because of the difference in time. The difference in the value of two amounts of the two different periods represents the interests, which is the cost of money to the borrower and a return to the lender. On this plea the discounted cash flow method discounts money due in the future to compensate for the interest it could earn if it were available today instead. The discounted value is called the present worth. This concept is obviously significant for evaluation of capital project by ensuring that the amount of investment is not

more than the present value of the future cash receipts. This is done by discounting future cash receipts to present value.

The discounted cash flow model is based on the following assumption:

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- The cash inflows from a project occur at the end of each period;
- The cost of capital—cost of funds obtained from investors—is determinable; and
- The rate of interest used is relevant for the life of the project. This would also mean that the cash inflows can be reinvested at the discounting rate.

The major techniques of discounted cash flow method have been discussed below:

The Net Present Value Method The net present value method attempts to discount the cash flows of a project to their present value using a pre-determined discount rate representing the cost of capital. This method aims to find the net present value of the project which represents the difference between the present value of cash inflows and the present value of cash outflows. If the present value of the cash inflows exceeds the present value of cash outflows the result is termed positive which indicates that the project earns more than the minimum acceptable rate of interest. The result is negative if the present value of cash outflows is greater than the present value of cash inflows because it would mean that the rate of return is less than the minimum acceptable rate. The net present value method involves the following steps:

(i) Estimation of project's cash inflows and outflows over the entire economic life of the project;

(ii) Discounting the cash flows to the present value by using the firm's cost of capital;

(iii) Calculating the net present value of the project by deducting the present value of cash outflows from the present value of cash inflows; and

(iv) The proposed project is accepted if the net present value of the project is positive and, otherwise, rejected. However, the mutually exclusive projects with positive net present value should be ranked in order of net present values—the higher the net present value, the higher the ranking.

The present value of a future amount of money can be computed by multiplying the future amount by the present value of ₹ 1. The present value of ₹ 1 can be computed with the use of following mathematical formula:

$$\text{Present value of ₹ } 1 = \frac{1}{(1+r)^n}$$

where r = interest rate or discount rate

n = number of years

Assume, for example, that ₹ 120 is to be received two years later with compound interest at 20 per cent.

The present value of ₹ 120 will be:

Present value of ₹ 1 at the end of 2nd year at 20 per cent discount rate:

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$$= \frac{1}{(1 + 20/100)^2}$$

$$= \frac{1}{(1.20)^2}$$

$$= \frac{1}{1.44}$$

$$= ₹\ 0.6944$$

Present value of ₹ 120 at the end of 2nd year at 20 per cent discount rate

= ₹ 0.6944 × ₹ 120

= ₹ 83.333

Thus, the present value of ₹ 120 at the expiry of two years at an interest rate of 20 per cent will be ₹ 83.333. In other words it means we have to invest ₹ 83.333 in order to receive ₹ 120 after 2 years at a interest rate of 20 per cent.

Often business executives have to compute the present value of a series of cash inflows to be received at periodic intervals in the future. For example ₹ 5,000 is to be received at the end of each year of six years with a compound interest of 10 per cent. Under such a situation the present value of six annual return is to be computed as shown below:

End of Year	*Present Value of Annual Returns*	$\left[\frac{1}{(1+r)^n} F^*\right]$
1	$\frac{1}{(1+10/100)^1} \times 5,000$	= ₹ 4,545
2	$\frac{1}{(1.10)^2} \times 5,000$	= ₹ 4,132
3	$\frac{1}{(1.10)^3} \times 5,000$	= ₹ 3,756
4	$\frac{1}{(1.10)^4} \times 5,000$	= ₹ 3,415
5	$\frac{1}{(1.10)^5} \times 5,000$	= ₹ 3,105
6	$\frac{1}{(1.10)^6} \times 5,000$	= ₹ 2,822
Present value of ₹ 5,000 received at the end of each year for 6 years (Total ₹ 30,000)		= ₹ 21,775

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On the basis of above working, the following equation can be developed to compute the present value for all the cash inflows generated out of an investment:

$$PV = \frac{F1}{(1+r)^1} + \frac{F2}{(1+r)^2} + \frac{F3}{(1+r)^3} + \dots \frac{Fn}{(1+r)^n}$$

where PV = Present value
F1, F2 and so on = Future cash inflow
r = Rate of interest
n = Expected life of the project.

Thus, the present value of annual returns in case of above example can also be computed as under:

$$PV = \frac{F1}{(1+r)^1} + \frac{F2}{(1+r)^2} + \frac{F3}{(1+r)^3} + \dots \frac{Fn}{(1+r)^n}$$

$$= \left[\frac{5,000}{\left[1+\frac{10}{100}\right]^1} + \frac{5,000}{\left[1+\frac{10}{100}\right]^2} + \frac{5,000}{\left[1+\frac{10}{100}\right]^3} + \frac{5,000}{\left[1+\frac{10}{100}\right]^4} + \frac{5,000}{\left[1+\frac{10}{100}\right]^5} + \frac{5,000}{\left[1+\frac{10}{100}\right]^6}\right]$$

$$= \left[\frac{5,000}{1.10} + \frac{5,000}{1.21} + \frac{5,000}{1.331} + \frac{5,000}{1.4641} + \frac{5,000}{1.61051} + \frac{5,000}{1.771561}\right]$$

$$= (4,545 + 4,132 + 3,756 + 3,415 + 3,105 + 2,822)$$

$$= ₹\ 21,775.$$

On the same basis the net present value can be computed with the use of the following formula:

$$NPV = \frac{F1}{(1+r)^1} + \frac{F2}{(1+r)^2} + \frac{F3}{(1+r)^3} + \dots \frac{Fn}{(1+r)^n} - I$$

where

NPV = Net present value
F1, F2...... = Future cash inflow
r = Rate of interest
n = Expected life of the project
I = Initial cost of the investment

The above-given mathematical formula can only be applied to such decisions where all cash outflows of the project take place in the initial period. In case of the investment where cash out-flows is spread over more than one year, the cash outflows are to be converted to present value along with cash inflows. According-ly, net present value model for conventional investment as given above is to be modified as shown below to have scope for non-conventional investment decisions.

$$NPV = \frac{F0}{(1+r)^0} + \frac{F1}{(1+r)^1} + \frac{F2}{(1+r)^2} + \frac{F3}{(1+r)^3} + \dots \frac{Fn}{(1+r)^n} -$$

$$I_0 + \frac{I_1}{(1+r)^1} + \frac{I_2}{(1+r)^2} + \frac{I_3}{(1+r)^3} + \dots \frac{I_n}{(1+r)^n}$$

NOTES

where

I_0, I_1, I_2 and so on = Cash outflows from zero period to nth period.

Illustration 12.3 Super Ess Ltd., is considering two mutually exclusive projects with an investment of ₹ 40,000 each. The details about the projects are given below:

Years	*Earnings before Depreciation after Taxation (Cash Flows)*	
	Project EMM (₹)	*Project BEE* (₹)
1	4,000	20,000
2	5,000	18,000
3	8,000	15,000
4	10,000	12,000
5	12,000	10,000
6	15,000	8,000
7	20,000	5,000

Management has decided to earn 10 per cent return on its investments. You are required to calculate present value of the two projects and suggest which of the two projects you consider is financially preferable.

Solution

Statement Showing Net Present Value (NPV) of EMM and BEE Projects

Year	*Project EMM*			*Project BEE*		
	Cash Flows (₹)	*PV of ₹ 1 (10%)*	*PV of Cash Flows* (₹)	*Cash Flows* (₹)	*PV of ₹ 1 (10%)*	*PV of Cash Flows* (₹)
1	4,000	0.91	3,640	20,000	0.91	18,200
2	5,000	0.83	4,150	18,000	0.83	14,940
3	8,000	0.75	6,000	15,000	0.75	11,250
4	10,000	0.68	6,800	12,000	0.68	8,160
5	12,000	0.62	7,440	10,000	0.62	6,200
6	15,000	0.56	8,400	8,000	0.56	4,480
7	20,000	0.51	10,200	5,000	0.51	2,550
Present value of cash inflows			46,630			65,780
Less: Cost of project:			40,000			40,000
Net present value			6,630			25,780

Comment

Above statement shows that project BEE is with highest net present value of ₹ 25,780 and therefore, must be preferred over project EMM which has net present value of ₹ 6,630 only. It means that the value of the firm will increase by ₹ 25,780 if it invests in project BEE but by only ₹ 6,630 if it invests in project EMM.

NOTES

Treatment of Project Salvage/Scrap Value in the Computation of NPV

Often capital projects when disposed of on their expiry realise some cash inflow in the shape of salvage value or scrap value. Such a value of the project is considered cash inflow for the project and is added with the cash inflows as generated by the project during its active life and, therefore, enters into computation of net present value of the project. Thus, salvage value of the project becomes a part of the n^{th} year cash inflow. Even the estimated salvage value of the project enters in the computation of the net present value of the project.

Illustration 12.4 National Company Ltd., is faced with the problem of choos-ing between two mutually exclusive projects with a cost of ₹ 45,000 each and requests you to advise them on the profitability of the projects. The cash inflows for the estimated life of the projects are expected to be as follows:

Years	*Cash Inflows*	
	Project-A (₹)	*Project-B* (₹)
1	4,000	12,000
2	12,000	16,000
3	16,000	20,000
4	24,000	12,000
5	16,000	8,000

The company's rate of return is 10 per cent. Both the pro-jects have a five-year life. Project A has a scrap value of ₹ 8,000 and Project B has ₹ 5,000 scrap value.

Solution

Statement Showing Net Present Value (NPV) of A and B Projects

Year	*Project A*			*Project B*		
	Cash Flows (₹)	*PV of ₹ 1 (10%)*	*PV of Cash Flows* (₹)	*Cash Flows* (₹)	*PV of ₹ 1 (10%)*	*PV of Cash Flows* (₹)
1	4,000	0.91	3,640	12,000	0.91	10,920
2	12,000	0.83	9,960	16,000	0.83	13,280
3	16,000	0.75	12,000	20,000	0.75	15,000
4	24,000	0.68	16,320	12,000	0.68	8,160
5	24,000*	0.62	14,880	13,000*	0.62	8,060
Present value of cash inflows			56,800			55,420
Less: Cost of project			45,000			45,000
Net present value			11,800			10,420

Comment

According to the above analysis, the National Company Ltd., should invest in Project A. Although both projects exceed the minimum rate-of-return objective, but the net present value of ₹ 11,800 from the Project A is more than the net present value of ₹ 10,420 from the Project B. Therefore, the Project A prom-ises slightly more than Project B in terms of addition to the value of the company.

NOTES

Internal Rate of Return (IRR) Method The second discounted cash flow technique of investment appraisal is the Internal Rate of Return method. It is also known as the *discounted rate of return method, the adjusted rate of return method, investors method*, and *time-adjusted rate of return method*. This method attempts to determine the rate of interest which when applied to the future income stream will exactly equate the present value of that stream to the present value of the investment. Such a rate of interest is technically known as *Internal Rate of Return*. Thus, the internal rate of return is the discount rate that equated the present value of net benefits from the project with the cost of the project. In simple words, the internal rate of return is that discount rate which will cause the net present value of the project to be equal to zero. This rate is also known as the "break-even" rate. The formula for calculating the internal rate of return is:

$$\text{NPV} = \frac{F1}{(1+r)^1} + \frac{F2}{(1+r)^2} + \frac{F3}{(1+r)^3} + \ldots \frac{Fn}{(1+r)^n} - I = 0$$

where

F1, F2 and so on = Future cash inflow

r = Rate of interest

n = Expected life of the project

I = Initial cost of investment

Under this method, the value of ₹ 1— internal rate of return is unknown which is determined internally. It is with this phi-losophy that this technique is known as internal rate of return method.

When the internal rate of return for the project is deter-mined, it is compared with the company's predetermined rate of return to measure the profitability of the project. The project that produces an internal rate of return greater than the company's predetermined rate of return (usually the cost of capital) is selected and is normally rejected in other cases. Where the method is used to choose between mutually exclusive projects, the project that produces the higher rate of return is selected.

The computation of the internal rate of return requires the same basic data which is used for the computation of net present value. There is no organised system for calculating the internal rate of return. It is found by trial and error. The present value of the cash flows from an investment must be computed at some arbitrari-ly selected interest rate. Where the present value of cash in-flows so computed is equal to investment cost that rate is selected. Normally the rate of return ranges between 10 per cent to 15 per cent, therefore, 10 per cent is a good start point for most of the problems.

Business experts have developed a systematic procedure for determining the internal rate of return wherein a factor techni-cally known as "*factor of the time-adjusted rate of return*" is computed by dividing initial investment by annual cash flow *i.e.*,

$$\text{Present value factor} = \frac{\text{Initial investment}}{\text{Annual cash inflows}}$$

NOTES

The factor so computed shows present value of ₹ 1 received annually over 'n' years and thus helps executives to determine the internal rate of return of the particular project from the present value annuity tables.

This systematic procedure used for determin-ing the internal rate of return is applicable only for such investment decision where annual cash flows from the investments are uniform over the entire life of the project. The investment projects with non-uniform annual cash flows are not within the scope of the ₹present value factor' system and as such it is not possible to use annuity tables to find internal rate of return. Therefore, in such investments, the internal rate of return is determined by hit and trial.

Illustration 12.5 Ordinary Company Ltd. is considering purchase of modern plant. Two types of plants —TEE and SEE are available in the market costing ₹ 4,25,070 and ₹ 3,18,030 respectively. The plants are mutually exclusive. The profits before charging depre-ciation but after payment of income tax are as follows:

Years	*Cash Inflows*	
	Plant TEE (₹)	*Plant SEE* (₹)
1	90,000	70,000
2	1,20,000	1,00,000
3	1,80,000	1,30,000
4	90,000	90,000
5	60,000	60,000

Calculate the internal rate of return and comment on the profitability of the project.

Solution

Statement Showing Internal Rate of Return for Plant—TEE

Year	*Cash Flows* (₹)	*Trail I*		*Trail II*		*Trail III*	
		Present Value Factor at 8%	*PV of Cash Flows* (₹)	*Present Value Factor at 10%*	*PV of Cash Flows* (₹)	*Present Value Factor at 9%*	*PV of Cash Flows* (₹)
1	90,000	0.926	83,340	0.909	81,810	0.917	82,530
2	1,20,000	0.857	1,02,840	0.826	99,120	0.841	1,00,920
3	1,80,000	0.794	1,42,920	0.751	1,35,180	0.772	1,38,960
4	90,000	0.735	66,150	0.683	61,470	0.708	63,720
5	60,000	0.681	40,860	0.621	37,260	0.649	38,940
Present Value of cash inflows			4,36,110		4,14,840		4,25,070
Less: Cost of plant			4,25,070		4,25,070		4,25,070
Net present value			11,040		(–) 10,230		0

NOTES

Statement Showing Internal Rate of Return for Plant—SEE

Year	Cash Flows (₹)	Trail I		Trail II		Trail III	
		Present Value Factor at 11%	PV of Cash Flows (₹)	Present Value Factor at 12%	PV of Cash Flows (₹)	Present Value Factor at 13%	PV of Cash Flows (₹)
1	70,000	0.900	63,000	0.892	62,440	0.885	61,950
2	1,00,000	0.811	81,100	0.797	79,700	0.783	78,300
3	1,30,000	0.731	95,030	0.711	92,430	0.693	90,090
4	90,000	0.658	59,220	0.635	57,150	0.613	55,170
5	60,000	0.593	35,580	0.567	34,020	0.542	32,520
Present Value of cash inflows			3,33,930		3,25,740		3,18,030
Less: Cost of plant			3,18,030		3,18,030		3,18,030
Net present value			15,900		7,710		0

Comments

The above result clearly shows that project TEE has an inter-nal rate of return at 9 per cent whereas the internal rate of return for project SEE is 13 per cent. Therefore, it will be profitable for the company to purchase plant SEE.

The NPV and IRR Methods Compared Both methods make use of discounted cash flows and both consider amount and time of the cash flow arising from a project. Therefore, there is much similarity between these two techniques. But at the same time they differ with each other on certain grounds. The important among them are:

(i) Under net present value method discounting factor *i.e.*, interest rate of the cash flow is known whereas such rate is worked out in case of internal rate of return.

(ii) The market rate of interest is used as basis for determining cost of capital which is mostly discounting factor under net present value method. On the other hand, the discounting factor and the market rate of interest are not so closely associated.

(iii) A project may have more than one IRR which is not possible in case of NPV.

Profitability Index Profitability index represents the ratio between present value of cash inflows and present value of cash outflows of a project. Thus,

$$\text{Profitability index} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outflows}}$$

This ratio provides a common measure for investments of different magnitude by expressing the present value of projects per rupee of investment. If the ratio is one or more than one the result is termed as positive and the project is considered desir-able. The project is considered undesirable under a reverse result. The higher the profitability index, the more desirable the project. Thus, it also helps executives in the ranking of competing projects particularly when investment cost differs significantly.

Illustration 12.6 A project requires initial investment of ₹ 85,000 and is expected to give cash flow of ₹ 18,000, ₹ 25,000, ₹ 10,000, ₹ 25,000 and ₹ 30,000 for five years. The project has a salvage value of ₹ 10,000. The company's target rate of return is 10 per cent. Calculate the profitability of the project by using profitability index method.

Solution

Statement Showing Net Present Value

Year	*Cash Flows (₹)*	*Present Value Factor at 10%*	*Present Value of Cash Flows (₹)*
1	18,000	0.909	16,362
2	25,000	0.826	20,650
3	10,000	0.751	7,510
4	25,000	0.683	17,075
5	40,000	0.621	24,840
Present value of cash flows			86,437

Note: Cash flow of the last year includes salvage value of ₹ 10,000.

$$\text{Profitability index} = \frac{\text{Present value of cash inflows}}{\text{Present value of cash outflows}}$$

$$= \frac{86,437}{85,000}$$

$$= 1.016$$

The profitability index is 1.016 which means net present value is positive. Therefore, project is desirable.

12.4 CAPITAL RATIONING

A company should accept a project with positive NPV. However, there are certain situations when a company cannot accept every project having positive net present value. It happens under the condition of shortage of capital. This situation is called capital rationing. Therefore, capital rationing is a state when a company has limited capital but the profitable projects having positive NPV are more in number. In such cases, the company has to decide which project is to be accepted out of all as all the projects meet the decision criteria of positive NPV. If a company has unlimited funds, then all the available independent projects which meet the decision criterion of finance managers can be accepted. However, this might not be the situation every time. Therefore, under a state of limited funds, the firm would like to accept the projects which are more profitable than others. This limitation of funds can be imposed by some external factors or by the company itself.. Thus,

capital rationing is the process of selecting only a few most profitable projects which provide a comparatively higher rate of return on per unit of money invested.

Reasons for Capital Rationing

NOTES

Broadly, the reasons or factors responsible for capital rationing can be divided into two categories. Capital rationing can arise because of (1) internal factors, or (2) external factors.

Internal factors are basically self-imposed restrictions or limitations by managers themselves. They can be in the form of setting a target budget, limit of capital for specific kind of long term investment decisions. Generally, these types of restrictions are imposed by companies which are conservative in nature and prefer to finance all its capital expenditure through internal financing. External factors involve prevailing inefficiencies in market due to lack of information or prevailing interest rate which creates paucity of capital for the business. The flow of capital is not easy because of external factors, and the firms may not have access to unlimited amount of funds to invest in all profitable projects.

Understanding the Capital Rationing Problem

Case 1: When projects are divisible

Amtck Ltd has INR 20 millions to invest in various projects. The following projects are available for allocating the capital budget of the company.

Projects	Initial Investment Required (In Million ₹)	Life of the Project (In Years)	NPV (In Million ₹)	PI (Profitability Index)
A	10	8	3.0	1.3
B	5	8	1.0	1.2
C	8	8	3.5	1.42
D	3	8	0.5	1.17
E	6	8	2.0	1.33
F	4	8	-1.5	0.63

As given in above example, all projects except Project F cannot be accepted as it has negative NPV. The total investment required for investing in projects A, B, C, D, and E is 32 million rupees (10+5+8+3+6). But the company has 20 million rupees with it. Therefore, it cannot invest in all projects. This is the problem of capital rationing. The simple and straight answer under such condition is, if company considers NPV as decision criteria then the projects having highest NPV will be accepted first and so on. Here, it is assumed that the projects are divisible. Therefore, the company has an option to invest in fraction also if a project is having higher NPV than the other projects. The highest NPV is of Project C followed by projects A, E, B and D. Project C needs an initial investment of 8 millions, Project A needs an initial investment of 10 millions. ₹ 18 million will be invested in these two projects and now the company is left with only ₹ 2 millions in its hands. Therefore, the company will invest ₹ 2 million in Project E which is

divisible project so that the company can invest a fraction of the initial investment also.

Case 2: When projects are indivisible

In the above situation, if the projects are indivisible then, ₹ 18 million will be invested in Projects C and A. But no project is available to invest in remaining ₹ 2 million. Therefore, the company has only two choices under such conditions. One, to keep these funds spare or to distribute the total investment in such a way that maximum of funds would be invested in one of the projects having positive NPV. But in such case, the company may not be able to maximize return on its investments.

Using profitability index (PI) as decision criteria under capital rationing situations

Using NPV as decision criteria under capital rationing situation is not wise. As the funds are limited and the profitable projects available are more in number, therefore the company must focus on the highest rate of return on every rupee invested rather than maximizing the NPV. Profitability index is the decision criteria to take correct decision under capital rationing situation. As stated in above example, the projects must be accepted in order of C, E, A, B and D considering their PI coefficient.

Check Your Progress

3. Name some of the discounted cash flow methods.
4. What is internal rate of return?
5. What are the internal factors responsible for capital rationing?

12.5 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The capital budgeting process begins with invitation of proposals from various departments of the organization.
2. In many business situations, a firm needs to choose one appropriate alternative among two or more alternatives associated with a capital project. These are known as mutually exclusive project decisions.
3. Some of the discounted cash flow methods include:
   - Net present value
   - Internal rate of return and
   - Profitability index
4. Internal rate of return is the discount rate that equated the present value of net benefits from the project with the cost of the project.

5. Internal factors responsible for capital rationing are basically self-imposed restrictions or limitations by managers themselves. They can be in the form of setting a target budget, limit of capital for specific kind of long-term investment decisions.

NOTES

12.6 SUMMARY

- Capital budgeting is a process of long range planning for acquiring such assets which will render some sort of service over several accounting periods.
- Payback method involves the calculation of the span of time required to recover initial cash investment.
- Post payback profitability index which is a ratio between post payback profi ts and investment.
- Payback reciprocal is a method of capital proposals that attempts to estimate the internal rate of return.
- Accounting rate of return method attempts to evaluate the project done on the basis of rate of return.
- Average rate of return on original investment considers average rate of return which is simply calculated by dividing the average earnings after depreciation and tax from the investment by the total investment.
- In average rate of return on average investment instead of original investment average investment is used for determining rate of return on investment.
- The discounted cash flows method deals with actual cash flow instead of the accounting concept of income.
- The net present value method attempts to discount the cash flows of a project to their present value using a pre-determined discount rate representing the cost of capital.
- Capital rationing may be defined as a process which involves necessary ranking of investment proposals for a fi rm with shortage of capital to invest.

12.7 KEY WORDS

- **Capital budgeting:** It refers to the practice of allocating money, on a regular basis, to eb used for acquiring capital assets.
- **Discounted cash flows method:** It refers to the method which deals with actual cash flow instead of the accounting concept of income.
- **Capital rationing:** It is the act of placing restrictions on the amount of new investments or projects undertaken by a company. This is accomplished by imposing a higher cost of capital for investment consideration or by setting a ceiling on specific portions of a budget.

12.8 SELF ASSESSMENT QUESTIONS AND EXERCISES

NOTES

Short Answer Questions

1. What are the expenditure for capital assets for whose planning and control capital budgeting is done?
2. Why is capital budgeting done?
3. List the principles of capital budgeting.
4. Mention the common proposals included in the process of capital budgeting.

Long Answer Questions

1. Describe the steps in the capital budgeting process.
2. Explain the types of decisions which a firm has to deal with based on the nature and scope of capital projects.
3. Discuss the major non-discounted cash flow methods.
4. Examine the major discounted cash flow methods.
5. What do you mean by capital rationing? What are the reasons for capital rationing?

12.9 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

Arora, M. N. 2012. *A textbook of Cost and Management Accounting, 10th edition.* New Delhi: Vikas Publishing House.

Maheshwari, S. N., Suneel K. and Sharad K. 2018. *A Textbook of Accounting for Management,* 4th edition. New Delhi: Vikas Publishing House.

UNIT 13 MANAGEMENT OF PROFITS/DIVIDEND POLICY

NOTES

Structure

13.0 INTRODUCTION

The earnings of a firm are required to be distributed among shareholders as dividends. The management of a firm formulates policies in order to carry out this process. These policies are covered under dividend decisions. Dividend policy is essentially the financing policy because it determines the retained earnings. Dividend means share out of profit, or that part of net earning which is paid to shareholders. The Income Tax Act, 1961 has defined dividend under Section 2(22) as 'any distribution of accumulated profits when it entails a release of assets or part thereof'. This unit will introduce you to the numerous dividend policies applicable in financial management.

13.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the meaning of dividend policy
- Describe the types of dividend policy/ models

- Examine the forms of dividends
- Discuss the factors influencing dividend policy

NOTES

13.2 MEANING AND TYPES OF DIVIDEND POLICY

Dividend policy is only a problem for those firms with positive earnings. It is both a problem and an opportunity for such firms. It is an opportunity because by the way of distributing dividends they can satisfy the shareholders. It is a problem as well, since no solid theory has yet been developed with which optimal dividend policy can be defined.

Profit-making firms face a dilemma because they have to decide whether to give returns in cash to the shareholders, or to use the funds earned by them for further investment. Substantial cut in dividend rate, even out of the need for investment could drop the share price which is an indicator of shareholders' wealth. Investors would like to sell not only because they would not be receiving dividends, but also because of the strong perception that dividend reveals something about future earnings. Cash dividend may be viewed as a signal of future stream of dividend to investors. Contrary to that when firms concurrently pay dividends and raise capital through security issues to stockholders, there are reasons to believe that a reduction in dividend payment could lead to an increase in share value.

Therefore, whether to pay dividends or retain profits is a dilemma. If dividends give immediate cash flow to the shareholders directly from the company, the retention of money deployed in a profitable manner would increase the share price and offer the capital gain, which is usually either not taxed or taxed at lower rate and that too after the indexation only when shares are sold.

This is not only a 'to-pay or not-to-pay' dilemma but the right decision would create better shareholder value, especially when shareholder expectation and company policy perfectly match with each other.

The reasons for a dividend dilemma are briefly summarized as below:

1. Shareholders expect adequate and regular dividends and also expect the company to retain money for future profits.
2. If dividends give immediate cash to the investors, a possibility of capital gain expected from the retention of profits (rather than payment of dividends) is sometimes valued more.
3. Retained profit is less expensive ownership money because it involves no issue expenditure. Readers know that less expensive funds create better value.
4. Investors pay tax at the personal income tax rates on the dividend income whereas capital gain tax is usually low. The burden of either income tax or capital gain tax depends on the tax law of the nation as well as the income level of an investor.

Most companies try to balance between the payment and retention of profits and attempt to create shareholder value.

Types of Dividend Policy

NOTES

The dividend is paid in cash as per the legal requirements of the Companies Act, 1956 (now the new Companies Act 2013). Dividend policy is expected to keep 'shareholders' confidence' as its focal point. Shareholder confidence is built through a consistency in dividend payment. The choice of dividend policy affects the value of the enterprise. A company may like to follow any of the following policies:

Fixed-rate dividend policy

When a company keeps the dividends per share constant every year, it is called a 'fixed rate dividend policy'. If profit is less, then the company would draw funds from the accumulated profits but would pay a constant rate of dividends. Shareholders get a kind of assurance about the rate of dividend, though the company's plan for reinvestment based growth would depend on the amount it is able to reinvest after paying the fixed rate.

Fixed-plus-extra dividend policy

Investors want a guarantee as well as more money if more profit is earned by the company. Also, it is very common for the shareholders to expect last dividend as the minimum for the coming year also. Therefore, some companies adopt a dividend policy that almost guarantee a fixed percentage of dividends (which is usually lower) and pay extra dividends depending on the profits. The carefully charted communication would make the shareholders realize that extra dividends cannot be for ever, or it can be variable. For example, through the action and communication a company may pay a fixed dividend of ₹5 per share and ₹1 extra in the year 2014.

Step-up-dividend-rate policy

This is essentially a fixed-rate dividend policy but when the company sees an opportunity for permanently increasing the dividend rate, it would do so and keep the new rate constant for some time before increasing it further. Growth companies are more likely to adopt this policy. Growth brings more profits enabling the company to pay more. Many companies adopt this policy, which readers would know from the study of dividend history of any company like Microsoft.

Stable dividend payout policy

In this policy companies predetermine the portion of profit that it would like to use for the payment of dividends and would plough back the rest. As a result the dividend rate fluctuates in proportion to and in the direction of profit changes.

NOTES

Example 13.1: Calculating the dividend per share

For example, a company follows a policy of 30% pay-out policy. It earned the following profits in the last three years:

2017: ₹10,00,000

2018: ₹20,00,000

2019: ₹12,00,000

If the company has 1,00,000 shares outstanding, calculate for each of the above years the amount of dividend and the dividend per share.

Solution: 2017: 10,00,000 × 0.30 = 3,00,000 Total dividends;

DPS: 3,00,000 ÷ 1,00,000 = ₹3.00

2018: 20,00,000 × 0.30 = 6,00,000 Total dividends;

DPS: 6,00,000 ÷ 1,00,000 = ₹6.00

2019: 12,00,000 × 0.30 = 3,60,000 Total dividends;

DPS: 3,60,000 ÷ 1,00,000 = ₹3.60

Thus, in the stable dividend pay-out policy the dividends as well as retained profits would vary depending on the profits.

Residual dividend policy

Companies which consider dividend decision as a part of the financing policy would like to follow the residual dividend policy. In this policy, the companies first determine the investment needs, and retain the profit accordingly. If net profit is lesser than investment requirement, no dividend is paid. In the absence of any investment opportunity, entire profit will be distributed. The dividend rate would be too fickle.

Example 13.2: Dividends in residual dividend policy

A company follows a residual dividend policy and pays dividends only if it has a surplus profit after meeting its retention requirement. The company has projected the profits and its requirements for the retention of profits as follows over the next three years:

Year	Expected Profits	Retention Required
2015	₹50,00,000	₹38,00,000
2016	₹75,00,000	₹75,00,000
2017	₹90,00,000	₹60,00,000

If the company has 150,000 outstanding shares, calculate the amount of projected dividend and dividend per share for these three years.

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Solution:

Year (1)	Expected Profits (2)	Retention Required (3)	Projected Dividends (4 = 2 - 3)	Projected DPS (5 = 4 ÷ number of shares)
2015	₹50,00,000	₹38,00,000	₹12,00,000	12,00,000 ÷ 1,50,000 = ₹8.00
2016	₹75,00,000	₹75,00,000	Zero	Zero
2017	₹90,00,000	₹60,00,000	₹30,00,000	30,00,000 ÷ 1,50,000 = ₹20.00

Research shows that past dividend rate and industry dividend rate influence the dividend decision of a company and hence the dividend pay-out fluctuates. Most companies desired to pay a stable dividend rate yet half of them were unable to stick to the policy. A negative correlation between profit ratio and pay-out ratio is also found by some researches. All these findings prove that companies try to maintain the dividend rate, and are ready to step it up only if they are sure of being able to maintain it later on. In case of a lean profit period, companies do not hesitate to go for a higher pay-out, if they can maintain the dividend rate; and when they are forced to reduce the rate, the reduction is kept to the minimum. Once again, it proves the theory that dividend is a 'primary and active' decision variable.

13.3 FORMS OF DIVIDEND

Dividends can be in the form of cash, bonus shares, stock split and reverse stock split. Cash dividends are nothing but payment of dividend in cash form which involves cash outflow and affects the liquidity of the firm.

13.3.1 Bonus Shares

Dividends must be paid in cash only. However, companies do distribute the benefits to shareholders through issue of bonus shares, which is also called as **stock-dividends**. This is the indirect benefit given to the shareholders. Bonus shares mean the distribution of additional shares free of charge to the existing shareholders. Bonus shares do not immediately result into the dilution of liquidity, but imposes a commitment on future cash-flow, since companies would normally like to maintain the rate of dividend even after the issue of bonus shares.

Issue of bonus shares is just an accounting entry in which accumulated reserves are transferred to the share capital and against that the new shares are issued to the shareholders. This increases the number of outstanding shares of the company and reduces reserves and surplus. The net worth is, however, unaffected. Earnings per share and market price of share should fall after the bonus issue. But, if the company is likely to maintain 'dividend per share' the bonus issue might increase the total value of the firm. Most successful companies can use the bonus issue as an important instrument to keep the dividend rate within a reasonable limit on one side, and giving very good returns to the shareholders on the other side, without getting into the visible signs of undercapitalization.

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The normative goal of bonus issue should be to improve the market price of equity shares. But Dr L C Gupta found in his study that the effect of bonus announcement on share prices was haphazard. Ojha's study also did not show much impact of bonus shares on valuation of firm. Dr. Gupta's observation is that the objective of issuing bonus was not mainly to increase total dividend distribution, but the practices had extreme diversity. This observation could be a true reason for haphazard response of equity price to bonus announcement. One third of the companies did not increase the total volume of dividend on the enlarged capital, and a significant number of them even reduced the quantum of dividend. Ojha also commented that maintaining dividend on enhanced capital base lacked proper weightage. Roughly half of the sample companies had reduced the dividend as a percentage of paid up capital. Dhameja also observed the same trend. It seems that companies paying high dividend rate usually had higher bonus ratios, and these companies could maintain the dividend as a percentage to paid-up capital. Obviously, the valuations of these companies have gone up.

Bonus issues, therefore, should not be in lieu of dividend, but it should be additional one, if value of the firm and shareholders' wealth has to be maximized. This happens because, percentage appreciation in share price are higher than percentage increase in dividend. It is not so in all cases of bonus issue.

Regulations on Bonus Shares

Section 63 of the Companies Act, 2013 gives rules governing the issue of bonus shares. Securities and Exchange Board of India has also issued SEBI (Disclosures and Investor Protection) Guidelines, 2000. The important provisions of these guidelines are:

1. Pre-requisites
   a. Company must have been authorised to pay bonus shares in its articles of association.
   b. Bonus shares can be issued out of free reserves created out of genuine profits and security premiums collected in cash only.
   c. Company should not have defaulted in interest payment or repayment of loans or in making any statutory payments.
   d. Bonus shares are not paid in lieu of dividends.
   e. After the issue of bonus share the share capital should not exceed the authorised share capital.
   f. Bonus shares cannot be issued if outstanding shares are partly paid up.
   g. Approval of banks and other lenders, if required, must be obtained.
2. Process
   a. Notify the Stock Exchange about the date of Board meeting in which bonus share issue proposal is listed on agenda.

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b. Decide and communicate 30 days in advance the book closure dates for this purpose.

c. Board of Directors need to (i) decide/recommend the issue of bonus shares as per the articles of association, (ii) authorise some officer to decide the dates for fixing a record date.

d. Intimate the Stock Exchange about the Board decision.

e. Where shareholder approval is not needed, implement bonus issue within 15 days of the Board decision.

f. General meeting must decide in favour of issue of bonus shares, where articles of association warrant so.

g. Where general meeting has approved the issue of bonus shares, the issue of bonus share must be completed within 2 months of the general meeting decision.

h. File return with the Registrar of Companies within 30 days of issue of bonus shares.

i. Apply for listing of new share certificates.

13.3.2 Stock Split

One more way the companies can distribute benefits to shareholders is by splitting the shares. One share is split into two or more in the stock-split action. For example,

Technically the stock split should not make any difference as it is neither a cash transaction nor even an accounting entry. Just face value of share is reduced and more shares are distributed. Still, stock split is a popular method of distribution among the shareholders, especially in USA.

Performance of companies reflects in the share price. If the share price is very high the small investors cannot afford to buy them and demand may decline. Therefore, when share prices are high a company may split the share so that the price per share will decline and come within the affordable range for the small investors. This will increase demand and liquidity of share. It has remained the interest of researchers to study the effect of stock-split on the valuation of firm. The findings are mix.

Appropriate procedure must be followed for the stock-split also. The procedure involves almost the similar steps as for bonus issues with some change in timeline. Board must decide, the book closure must be affected, stock exchange must be informed, effect be given in certain time frame and also get the new shares listed.

13.3.3 Reverse Stock Split

As the terms indicate the shares are merged or combined in the reverse split. Defined number of share is merged into one. The number of outstanding shares

reduces but the market capitalisation would remain the same after the reverse split. For example, City Bank went for reverse split in the ratio of 1 to 10 and merged ten shares into one in 2011.

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Reverse split is helpful in reporting higher earnings per share, which would act as a confidence boosting act sometimes. If the company wants to change its clientele from small investors to large ones, the reverse split becomes a useful tool.

Stock Repurchase

Stock repurchase, also known as buyback of shares, involves the company making offer to all its shareholders to buy back its own shares at the specific price. The company will need cash to pay for the buyback and will have the reduced number of outstanding shares.

In India companies were not allowed to buy back shares for long time. Since only 1999 in India companies are allowed to buy back their own shares, subject to some rules.

When Buyback is Useful

The stock repurchase is advisable in certain situations:

- When shares are undervalued in the market
- If the company has cash surplus for a long period of time
- If the management wants to increase the controlling interest in the company
- If the management intends to take the company private
- To block the takeover attempt
- To achieve the targeted debt-equity structure

Undervalued shares

Often shares of companies are not traded at the fair prices. If the management is of the view that shares are undervalued, they may like to buy back the shares and send positive signals in the market about the fair price.

Surplus cash

The undervaluation may also occur when a company is sitting on huge amount of cash surplus and has no profitable investments on horizons. Cash on hand, no investment opportunity and low share price is a perfect situation for the management to start buyback.

Increase in controlling interest

Buyback of shares reduce the number of outstanding shares without reducing the shares held by the management group. Thus, management group's holding percentage will increase without investing more money in the company.

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Taking company private

Through the buyback the management can take a publicly traded company private. There are many reasons taking a public company private can be beneficial. This process is subject to law of the land.

Block takeover bid

When a management senses a hostile takeover bid the company may try to foil the attempt by pushing up the market price, which can be done by making a counter offer of buyback at a higher price making it expensive for the hostile takeover.

Achieving targeted capital structure

Buyback of shares reduce the equity and increase the debt-equity ratio without taking more debt. If the current financial leverage is inadequate, and the company has some more risk appetite the buyback would serve good purpose of achieving targeted debt-equity structure.

Important Rules Governing Buyback

Buy back is subject to some rules, important of which are given below:

1. It should have been authorised by the article of association of the company.
2. Shares must be fully paid up.
3. If the buyback is 10% or less of the paid up capital a simple resolution in Board is enough, otherwise a special resolution in general meeting is needed.
4. Buyback can be done only after six months of the previous buyback.
5. Buyback must be completed within 365 days.
6. Buyback should be 25% or less of the paid up capital and free reserves.
7. The debt-equity ratio should not fall below 2:1 after the buyback.
8. Companies also need to adhere to the stipulations of SEBI, if shares are listed on the stock exchange.
9. The shares can be bought back from the free reserve only and the sum equal to the nominal value of shares must be deposited in the capital redemption reserve account.
10. Buyback of shares can be done in any of the following ways:
    - From existing shareholders on proportionate basis.
    - Through either open market or through book-building process.
    - From buying odd lots on recognised market.
    - By purchasing shares issued to employees under the stock option plan.
    - By buying the sweat equity.

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Check Your Progress

1. What is a step-up-dividend-rate policy?
2. What should be the normative goal of bonus issue?
3. What happens after a reverse stock split?

13.4 FACTORS INFLUENCING DIVIDEND POLICY

In absence of any sound theoretical solution to the problem regarding a dividend policy, the idea of important managerial considerations assumes a lot of significance. In practice the following factors are taken into account while designing the dividend policy:

- **Amount of earnings:** The level of earnings is the prime factor affecting the dividend policy of a company. The level of earnings is measured in terms of 'earnings per share' because dividends are paid in 'dividend per share'. Accumulated profits also have some implications on the dividend policy of a company.
- **Cash flows:** Dividends are paid in cash. Therefore, cash profits and total cash flow become meaningful factors in determining the dividend policy. It is not prudent to borrow for the purpose of the dividend payment.
- **Tax incidence:** Tax implications on dividend payment have some bearings on the pragmatic dividend policy. In India currently the shareholders do not pay income tax on dividend income received from the domestic companies, but the companies distributing dividends pay 15 per cent dividend distribution tax and also surcharges on it. This may be beneficial for high income shareholders but detrimental to the interest of low income shareholders. The dividend behaviour of the companies would change with such tax provisions.
- **Need for funds:** Generally, it is assumed that companies in need of funds would keep the low pay-out and vice versa. But some researchers have observed that future investment intention and loss of funds in research and accumulated burden of tax-liability were of very little importance in dividend policy, even when external funds were found costlier. This once again proves that companies treat the dividend decision as primary decision. The author found that growth-oriented companies, new breed of management and the new companies followed the retention oriented policy. Even large companies did not emphasize on use of internal financing in their financial policy-making as compared to small and medium companies. This could be due to a variety of reasons, like, large companies might have got built-in debt capacity and shareholders are always watchful of financial signals of large companies.

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- **Liquidity of the firm:** Firms with a cash crunch position would not like to aggravate it by the way of lenient dividend policy. However, firms in distress are also found to even borrow and pay dividends, if they have some profits but face cash crisis. However, a prudent practice would support the conservation of liquidity through dividend policy. Cash rich companies would like to pay more dividends.
- **Ability to borrow:** When the dividend decision is considered to be primary, a company would not like to retain too much unless it is unable to borrow from the market. However, it is also true that the retained earnings increase the equity, which enhances the borrowing power of the firm.
- **Controlling interest:** Persons with controlling interest in the company matter a lot in dividend decisions. It is clearly noticed that most of the group companies and multinational companies indicated the intention to draw out funds as early as possible.
- **Restrictions:** The dividend payment is governed by the Companies Act, 1956 (and now by the new Companies Act 2013). Institutional investors also often impose restrictive clauses on the dividend payment. The flexibility of companies in making dividend decision is within the boundary of these legal and contractual restrictions.
- **Risk of takeover bid:** A dividend policy that pulls down the share prices exposes the company to a chance of takeover. If a company is viewed distributing dividends despite having growth opportunities may start losing its share prices. Likewise a company, which is distributing less dividends despite having not much growth opportunities is also likely to face fall in share prices. In both the situations chance of takeover bid increases.
- **Criticism of high dividends:** A firm paying very high dividends may be perceived to be wooing investors and send wrong signals that not everything is well in the company. This happens when there are reasons for not distributing very high dividends and still a company does so.

13.5 DIVIDEND THEORIES/MODELS

There are various theories regarding relationship between dividend distribution and value of firm. All these theories can be grouped as relevance and irrelevance theories. Proponents of relevance theories claim that dividend distribution is relevant to the value of firms i.e., there is a relationship between payment of dividend and its market value whereas proponents of irrelevance theories claim that dividend distribution does not affect the value of the firm i.e., relationship between payment of dividend and its market value does not exist.

13.5.1 Relevance Theory: Walter's Model

Walter theory of dividend policy is considered as a relevance theory because it states that the dividend policy always affects the value of firm. Research paper of Prof. James E. Walter with the subject 'Dividend policy: its influence on the value of enterprise' was published in Journal of Finance in 1963. His research and proposed model clearly shows the relevance of dividend distribution for the valuation of firm or market price of shares. He showed the relationship between cost of capital k and rate of return r, contributing positively in the value of firm.

This model is based on the following assumptions:

- **Infinite time**: Life of a business/firm is infinite and business will last for a very long time.
- **No change in proportion of dividend and retained earnings**: (EPS and DIV remain constant). Once decisions related to the DIV and EPS have been made by the company, these decisions will be constant afterwards.
- **Total internal financing**: Firm finances its funds requirement from its retained earnings only. Firm does not issue new equity or fresh debt.
- **Constant rate of return and cost of capital:** Rate of return (r) on the firm's investment remains constant. Similarly, cost of capital for the business/firm (k) also remains constant.
- **100% payout or retention**: Firms either distribute 100% of their earnings or they retain 100%.

As per this model, market price of a share is the sum of present value of the infinite stream of the constant dividend and present value of the infinite stream of capital gain which is presented in the following equation.

$$P = \left(\frac{Div}{k}\right) + \frac{r/k}{k}\ (EPS - Div)$$

Here, P is market price of share, Div is dividend per share, EPS is earnings per share, r is rate of return and k is cost of capital or capitalization rate.

Criticism of Walter's Model

- Rate of returns does not remain constant.
- Assumptions related to the external financing cannot be considered appropriate as firm uses both external and internal financing.
- Cost of capital does not remain constant.

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13.5.2 Dividend Relevance: Gordon's Model

Gordon's model is also based on relevance theory, but he has given some more justification for it. This model was developed by Myron J Gordon in his work entitled 'The investment, financing and valuation of corporations'. This model is based on some assumptions discussed as follows:

Assumptions

- Firm uses only equity source of financing to finance its investment requirements.
- Cost of capital (k) and rate of return (r) remains constant in this theory too.
- No external financing and no taxes.
- Rate of retention remains constant once decided.
- Cost of capital (k) is greater than growth rate (g). This is the most important assumption of this model. If cost of capital (k) is not greater than growth rate (g) then it is very difficult to calculate the market price of the share.

As per this model, market price of a share is equal to the present value (PV) of infinite stream of dividends on that shares. This is called dividend capitalization technique of calculating market price of a share. The equation for dividend capitalization model is as follows:

$$P_0 = \frac{Div_1}{(1+k)} + \frac{Div_2}{(1+k)^2} + \frac{Div_3}{(1+k)^3} + \cdots + \frac{Div_\infty}{(1+k)^\infty} = \sum_{t=1}^{\infty} \frac{Div_t}{(1+k)^t}$$

Dividend is expected to grow in future when company retains its earnings.

$$Div_t = (1-b)EPS_t$$

Dividend is the multiplication of (1-retention ratio) i.e. payout ratio and earnings per share. In all the equity firms, it is assumed that total earnings are reinvested/retained so that the growth rate, g = br per period. Here, b is retention ratio and r is rate of return. When growth in dividend is incorporated in the above equation of P0, then the equation becomes,

$$P_0 = \frac{Div(1+g)}{(1+k)} + \frac{Div(1+g)^2}{(1+k)^2} + \frac{Div(1+g)^3}{(1+k)^3} + \cdots + \frac{Div(1+g)^\infty}{(1+k)^\infty} = \sum_{t=1}^{\infty} \frac{Div\,(1+g)^t}{(1+k)^t}$$

After solving above equation it will become,

$$P_0 = \frac{Div_1}{k-g}$$

or

$$P_0 = \frac{EPS_1(1-b)}{k-br}$$

In the above equation, it is clearly depicted that there is a relationship in cost of capital, rate of return, earnings per share, retention ratio and market price of the firm.

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Criticism of Gordon's Model

- Rate of returns does not remain constant.
- Assumptions related to the external financing. Firm uses both external and internal types of financing.
- Cost of capital does not remain constant.

13.5.3 Dividends and Uncertainty: The Bird-in-the-hand argument

In uncertain situations, dividend payment affects the value of firm. In this case, 'the bird-in-the-hand argument' plays important role. As per this argument, near profits are much more desirable than distant profits.

Dividend Irrelevance: The Miller–Modigliani (MM) Hypothesis

The Miller-Modigliani theory is irrelevant theory as it claims that dividend policy of a firm does not affect the value of a firm. M-M gives an argument to support its view that the value of firm is the function of its earning which is dependent upon the investment policy not on its dividend policy. As per this theory, the value of a firm is dependent on earnings of the firm which is also dependent upon the investment decisions and investment policy of the firm. Thus, value of firm is not dependent on the dividend decisions of a firm rather it is dependent on the investment decisions which also influence the dividend decisions.

The nitty-gritty of MM hypothesis is that shareholders do not depend on the dividend for attaining cash. In the absence of flotation cost, transaction cost, taxes on the dividend and capital gain (assumption of MM hypothesis) less restriction on selling shares, investors can generate cash by selling their shares. As a result, high payout firms need not grasp higher price for their shares.

This theory is also dependent on some assumptions. A brief explanation of these assumptions is as follows:

- An assumption of perfect capital market in which investors behave rationally, there are large number of buyers and sellers, fair price of the product, free flow of information, no transaction cost and no flotation cost.
- Risk of uncertainty does not exist as per this theory. Investor can forecast future earnings and dividend with accuracy.
- Firm has fixed investment policy.
- Taxes do not exist on dividend and capital gain too.

We know that the rate of return of a share includes two components, one is dividend and other one is capital gain. Therefore, return on a share r includes following:

$$r = \frac{Dividends\ and\ capital\ gain\ (losses)}{Share\ Price}$$

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As per the assumptions of MM theory, r will be equal for all shares. If it is not then investor will sell low return yielding shares and buy high return yielding shares. This buying and selling will make return on all these shares equal. MM valuation model can be re-written as follows:

$$r = \frac{Div_1 + (P_1 - P_0)}{P_0}$$

Or

$$P_0 = \frac{Div_1 + P_1)}{1+k} \text{ (As r = k)}$$

$$V = nP_0 = \frac{n(Div_1 + P_1)}{(1+k)}$$

(As r = k)

Check Your Progress

4. State the prime factor affecting the dividend policy of a company.
5. Why are very high dividends criticised?
6. What is the market price of a share as per Walter's model?
7. What is the basic principle of Miller-Modigliani theory?

13.6 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. A step-up-dividend-rate policy is essentially a fixed rate dividend policy but when the company sees an opportunity for permanently increasing the dividend rate, it would do so and keep the new rate constant for some time before increasing it further.
2. The normative goal of bonus issue should be to improve the market price of equity shares.

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3. For a reverse stock split, the defined number of shares is merged into one. The number of outstanding shares reduces but the market capitalisation would remain the same after the reverse split.
4. The level of earnings is the prime factor affecting the dividend policy of a company. The level of earnings is measured in terms of 'earnings per share' because dividends are paid in 'dividends per share'.
5. A firm paying very high dividends may be perceived to be wooing investors and send wrong signals that not everything is well in the company.
6. As per this model, market price of a share is the sum of present value of the infinite stream of the constant dividend and present value of the infinite stream of capital gain.
7. As per Miller-Modigliani theory, value of a firm is dependent on earnings of the firm which is also dependent upon the investment decisions and investment policy of the firm.

13.7 SUMMARY

- Dividend policy is only a problem for those firms with positive earnings. It is both a problem and an opportunity for such firms. It is an opportunity because by the way of distributing dividends they can satisfy the shareholders.
- Profit-making firms face a dilemma because they have to decide whether to give returns in cash to the shareholders, or to use the funds earned by them for further investment.
- The choice of dividend policy affects the value of the enterprise. A company may like to follow any of the following policies: fixed-rate, fixed-plus-extra, step-up-dividend-rate, stable, residual dividend policy, etc.
- Dividends can be in the form of cash, bonus shares, stock split and reverse stock split.
- The following factors are taken into account while designing the dividend policy: amount of earnings, cash flows, tax incidence, liquidity of the firm, controlling interest, restrictions, risk of takeover bid, etc.
- There are various theories regarding relationship between dividend distribution and value of firm. All these theories can be grouped as relevance and irrelevance theories. Proponents of relevance theories claim that dividend distribution is relevant to the value of firms i.e., there is a relationship between payment of dividend and its market value whereas proponents of irrelevance theories claim that dividend distribution does not affect the value of the firm i.e., relationship between payment of dividend and its market value does not exist.

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13.8 KEY WORDS

- **Dividend Policy:** It refers to the set of guidelines a company uses to decide how much of its earnings it will pay out to shareholders.
- **Stock split:** It is a type of dividend in which one share is split into two or more.
- **Bonus shares:** It refers to the distribution of additional shares free of charge to the existing shareholders.
- **Stock repurchase:** Also known as buyback of shares, it involves the company making offer to all its shareholders to buy back its own shares at the specific price.

13.9 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. What are the reasons for a dividend dilemma?
2. Write a short note on the types of dividend policy.
3. What are bonus shares?

Long Answer Questions

1. Explain stock split and reverse stock split are forms of dividend.
2. Discuss the factors taken into accounting while designing the dividend policy.
3. Describe the major dividend theories and policies.

13.10 FURTHER READINGS

Sahaf, M. A. 2013. *Management Accounting: Principles and Practice*, 3rd edition. New Delhi: Vikas Publishing House.

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UNIT 14 OVERVIEW OF LATEST DEVELOPMENTS IN ACCOUNTING

Structure

14.0 INTRODUCTION

The business world is in constant change. Today's competitive markets are characterized by accelerating changes, innovations and immense new information. Much of this rapid evolution in business is fuelled by enhanced customer expectations and competition. In fact, the changes in customer expectation and competitive environment will have a far-reaching consequence on every activity of business. Although on the one hand these changes will make it possible for the firms to become more responsive, on the other hand the extremely complex and diversified business environment will render obsolete many of the currently available business practices and techniques that have driven the business process for decades. Thus, the firms that learn to adapt in a highly dynamic and competitive environment will be successful. At the same time new techniques and frameworks will be called for to meet the growing demands of competitive business environment of the near future. The changing scope of management accounting calls for the study of the following concepts and techniques that will be extensively used by the business firms to meet the challenges of business in the near future.

14.1 OBJECTIVES

After going through this unit, you will be able to:

- Explain the concept of transfer pricing
- Examine divisional performance analysis

- Describe the idea of responsibility accounting
- Discuss inflation accounting
- Examine the concept human resource accounting

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14.2 DIVISIONAL PERFORMANCE ANALYSIS

Companies that opt for the divisional form of organizational structure allow managers of the divisions to work independently. Consequently, the divisions either enjoy autonomous or semi-autonomous status within the company. With this autonomy to the divisions, the companies need to devise some kind of criteria that would measure the performance of the divisions. Divisional performance appraisal refers to a system that is used to measure and assess the performance of the divisions of a company. Generally speaking, the objective of divisional performance is to help the management in planning and controlling the operation of a responsibility centre. However, the specific objectives of a divisional performance evaluation system are: goal congruence, motivation and feedback.

Goal Congruence

The goal congruence objective of performance evaluation system attempts to bring a harmony between the divisional goals and corporate goals. In fact, it brings unity of direction in the division to ensure achievement of company goals through divisional goals. For example, if a selling division was evaluated on the basis of sales, the divisional manager would naturally try to maximize the sales and would not bother for the cost structure of the division. On the contrary, if the company is interested in maximizing its earnings, divisional performance would fail to achieve this corporate goal and as such it would be said that goal congruence has not been achieved. Thus, the principle of goal congruence brings together the working of various responsibility centres of a company in order to achieve corporate goals.

Motivation

The performance evaluation system should be flexible enough to make the divisional manager feel that within the prescribed limits, they have genuine autonomy. It should encourage them to take a decision. For example, if the divisional manager finds an opportunity that would fulfil the corporate objective at the cost of divisional interests, the performance evaluation system should encourage the manager to capitalize the opportunity without making him feel that he would be penalized.

Feedback

The top management of a company is always interested to know the economic worth of a responsibility centre and the capabilities of the concerned divisional manager. It is, therefore, the responsibility of the performance evaluation system to supply the requisite information at regular intervals.

Measuring Division Performance

The essence of divisionalization is the decentralization of decision making from the top management to the divisional managers of an organization. A division called responsibility centre can be either a profit centre or investment centre depending on its contribution to the net earnings of the organization. The measurement of performance is necessary for attaining the goals of an organization. The popular approaches to measure the performance of a division are:

- variance analysis;
- contribution margin;
- net profit;
- return on investment; and
- residual income.

Variance Analysis

Variance analysis attempts to analyse the deviation between expected and actual operations of a responsibility centre. Such a study would cover the analysis of two responsibility centres—cost and revenue. Accordingly, there can be two variance analyses, viz.,

- cost variance analysis and
- revenue variance analysis.

The performance evaluation of a cost centre is done on the basis of costs only without analysing its contribution to the net earnings of the organization. Therefore, the measure of efficiency of a cost centre is usually developed by comparing the costs that it should have incurred with the costs that it actually incurred on a given activity. Thus, the efficiency of cost centre is expressed in terms of a ratio between actual cost and budgeted (standard) cost. However, this approach may lead to the assumption that 'the best cost centre is the one that spends the least'. Such an approach fails to consider the real role of cost centre in attaining organizational goals. In fact, an ideal procedure for performance evaluation calls for the evaluation of both financial and non-financial measures in its operation.

Revenue variance analysis attempts to measure the performance of a revenue centre. A measure of efficiency can be developed in a revenue centre by comparing actual sales with the budgeted sales. When the actual sales are higher than the budget sales, the efficiency of the revenue centre is higher. The manager of a revenue centre should be encouraged to make decisions so that profits can be maximized.

Contribution Margin

Another most significant method of measuring divisional performance is to determine the contribution margin of the division. Such a margin represents the amount of

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revenue generated by the division after meeting its direct costs. Thus, this evaluation determines the extent to which the division is providing a contribution to the net earnings of the organization. The contribution margin seems sound as a measure of divisional performance but not as a good index of the divisional manager's performance unless he is allowed to restructure the investments or key personnel of the division.

Net Profit

Net profit as a formal measure of divisional performance is widely accepted and used. Net profit represents the amount of revenue left after deducting from it the costs which can be directly traced to the division whether controllable or not. Such costs include direct costs and the portion of indirect costs that are incurred for the benefit of the division. This measure tends to reduce motivation on the part of divisional managers because of unfavourable profit variance caused by unexpected large corporate expenses over which they have no control. This may lead to sub-optimal decision making. This measure of profit may also be criticized because all methods of apportioning corporate expenses are arbitrary which may have adverse behavioural effects.

Return on Investment (ROI)

Return on investment as a useful measure of managerial efficiency determines the rate of return which a manager of an investment centre is able to generate from the assets under his control. In fact, this measure indicates the efficiency of the investment centre in utilizing its assets. It blends together many aspects of the investment centre into a single figure that can be compared against the competing centres of the firm. The ROI can be determined with the help of the following formula:

$$\text{Return on investment (ROI)} = \text{Asset/Investment turnover} \times \text{Earning rate}$$

$$= \frac{\text{Sales}}{\text{Total assets/Investment}} \times \frac{\text{Earnings (divisional)}}{\text{Sales}} = \frac{\text{Earnings (divisional)}}{\text{Total assets/Investment}}$$

Measurement of Investment: To measure a division's investment, a management accountant has to first decide about the following two important issues:

- What constitutes the division's investment?
- How the items of investment will be valued?

The computation of a division's investment for the purpose of ROI includes:

- Value of the assets that are physically located in the division and exclusively used for its operation; and
- Apportioned value of the assets that are pooled/shared among the different divisions. Some experts are of the opinion that such assets should be excluded from the investment base of a division on the plea that these assets are not directly traceable to a division.

Once the decision regarding the items to be included in the investment base is taken, the monetary value of such items is to be determined. In this regard, a management accountant has to choose among the following alternatives: gross book value; net book value; and current replacement cost. However, the net book value approach is widely used choice. In this approach, the value of an asset represents its written down value, *i.e.*, original cost minus accumulated depreciations. This approach makes the comparison between the divisions difficult because a division with old assets will have a higher rate of return than a division with new assets simply as a result of lower original cost. When gross book value is used, fixed assets are shown at their original cost without any reduction for depreciation. Such an attempt consistently understates a division's time adjusted rate of return (also called internal rate of return). Both these methods, *i.e.*, net book value and gross book value fails to reveal the real value of division's investment. To overcome this limitation, a number of firms use current replacement cost of the assets. The current value of an asset represents the amount for which it can now be purchased from the market. This method calls for a wide range of subjective judgments.

Illustration 14.1: Compute return on investment of a service division of XY Limited from the following information given below:

Assets	₹
Stock	40,000
Debtors	30,000
Bank	15,000
Plant (net)	1,50,000
Building (net)	75,000
	3,10,000

The amount of sales and earnings as given in profit and loss account were ₹ 16,00,000 and ₹ 1,60,000 respectively.

Solution

ROI = Assets/investment turnover × Earning Rate = 5.16 × 0.10 = 0.516

An equivalent computation would be:

$$ROI = \frac{\text{Earnings}}{\text{Total assets/investment}} = \frac{₹\,1,60,000}{₹\,3,10,000} = 0.516$$

The analysis of the above illustration clearly reveals that an investment centre can improve return-on-investment by three ways, viz.,

- increasing sales volumes
- reducing expenses
- reducing assets (investment).

Traditionally the evaluation of managerial performance was based on the earnings of the division and the amount of investment in assets was in no way used for this purpose. The significance of investment turnover in the evaluation of managerial performance is not widely practiced. This fact was recognized first by Du Pont.

NOTES

Residual Income

Another approach for measurement of performance in an investment centre is residual income. This measure of divisional performance aims to maximize the total amount of residual income. Residual income represents the amount of the division's net operating income left after deducting from it the amount of imputed capital charges on the assets used by the division. The capital charges is the minimum rate of return on operating assets as expected by the management. Usually this minimum rate of return is the division's cost of capital, and therefore, any surplus automatically represents residual income.

Illustration 14.2: Compute the residual income for the sales department of R & Co. for 2012 from the information given below:

Sale – 10,000 units @ ₹ 65 each

Variable cost – ₹ 30 per unit

Fixed cost ₹ 1,20,000

Total Assets of sales department ₹ 5,20,000

The management of R & Co. expects a minimum rate of return of 12 per cent on its investment.

Solution

Divisional Residual Income Statement

Particulars	₹
A. Sales	6,50,000
B. Variable cost	3,00,000
C. Contribution (A – B)	3,50,000
Less: Fixed costs	1,20,000
Operating profit	2,30,000
Less: Capital charges	
(Minimum rate of return × Total assets/investment) (12/100 × 5,20,000)	62,400
Residual income	1,67,600

14.3 TRANSFER PRICING

Transfer price is the intra-company price at which goods and services of a profit centre are sold to another responsibility centre within the same company. For example, a readymade garments selling company may have subsidiaries that provide the cloth and that tailor it, each charging the successive processor for its product. A major problem of transfer pricing is to derive an appropriate price at which goods and services should be transferred from one division to another division. Since the price charged will affect the profit of both divisions, opposing forces would be immediately created. As a consequence, the division acquiring the good would be interested to minimize the transfer price and the division selling the goods would try to maximize the transfer price. However, this conflicting situation within the organization will not directly affect the performance of the firm as a whole because price charged by one division would be price paid by another division. But there may be so many indirect effects. A particular transfer base may be excellent for managerial performance measurement purposes, motivating divisional managers, instituting and maintaining cost control programmes, achieving full utilization of excess capacity, or the proper allocation of company resources.

Methods of Transfer Pricing

There is no single pricing method which can be appropriate for all situations. In practice, the following general approaches are used in setting transfer prices:

- Cost-based pricing
- Market-based pricing
- Negotiated pricing
- Dual-rate pricing

Cost-based Pricing

Cost as a base for a transfer price is widely accepted and used. It is a natural extension of the cost principle which permeates all of accounting practice. Cost-based price may take any form. The most popular among them are:

Actual or Full Cost Pricing: Under this method, this transfer price represents accumulated cost of goods that are being transferred. The accumulated cost includes direct material, direct labour and overheads. When full cost method is used as transfer price, the selling division's contribution margin is just sufficient to meet the fixed costs. The actual cost method does not permit the selling division to earn any profit in the goods or services transferred. The division would prefer to use full cost as transfer price as long as the demand is low and the division has available production capacity. But as and when the demand increases, it would prefer to transfer goods, at market price which would be definitely higher than the full cost. This method makes the effectiveness of cost control doubtful as there is scope for

shifting of inefficiencies to others because of full cost recovery by the division selling the goods from the division acquiring the goods.

Variable Cost Pricing: Under this method transfer would be made at the variable production costs which include marginal cost of a product or service like direct material, direct labour and variable overheads. In the short period, variable cost is also known as incremental cost because during this period, the difference in the total cost (incremental cost) as a result of change in activity level is equal to variable cost. As long as the selling division has a capacity to produce in the short period, variable cost may seem a sound pricing method for transfer of goods. But in the long period, any extension in the capacity would require additional fixed costs, and therefore, the selling division would prefer to use full cost rather than variable cost. The most important disadvantage of basing transfer prices on variable costs is that it tends to discourage the divisional manager to produce more as any addition to the output produces a zero contribution margin. Consequently, the objective of divisional performance appraisal is defeated.

Standard Cost Pricing: Under this approach transfer would be made at pre-determined (standard) cost of product or service. Thus, transfer price based on standard cost equals a product's material, labour and fixed manufacturing costs allocated to it. The major advantage of standard cost is that it ensures efficiency in the selling division by using proper cost control. Therefore, there is no scope of shifting the inefficiencies of selling division to the buying division. This arrangement of transfer price permits quotation of price prior to completion of actual production.

Cost-plus Pricing: Cost plus is a widely used as a basis for transfer prices. Under this system transfers would be made at the full cost plus a profit mark-up. The profit mark-up which represents a stated percentage of total cost is decided by the top management of the company after taking into consideration the target rate of return. However, the mark-up may also be determined on the basis of profit margin realized or expected to be realized by the competing units within the same industry. In the former approach the transfer price shall provide an index which is a surrogate for market price whereas in the latter approach the transfer price will represent market price. There is enough scope for passing on both the efficiencies and the inefficiencies of selling division to buying decision in this arrangement of transfer. Therefore, cost-plus arrangement of transfer pricing neither appreciates efficiency nor penalizes inefficiency. Further, the selling division is automatically given a certain level of profit in the form of mark-up which makes the performance evaluation doubtful.

Opportunity Cost Pricing: Opportunity cost pricing suggests to value the transferred goods on the basis of opportunity cost which represents the potential benefit of the goods transferred that is lost because of being sold internally. Usually

the opportunity cost of the goods transferred represents their market price subject to the assumption that the entire produce of the selling division at full capacity is sold to outside customers. This opportunity cost would change if the selling division has substantial excess capacity. Under such circumstances (depending on what alternative uses the seller has for his or her excess capacity), the opportunity cost may be zero (Garrison, 1979). Therefore, the transfer price shall have to be below the market price. Under excess capacity conditions, so long as the selling division can receive a price greater than its variable costs (at least in the short run) all parties will benefit by keeping business inside rather than having the buying division go outside (Ibid.).

Market-based Pricing

Another alternative for transfer pricing is market price approach. In this approach, intra-company transfers are valued at some form of competitive market price. In other words, it is a price at which goods or services can be purchased or sold by independent buyers and sellers. Under this system, each division is treated as an independent entity that is free to purchase from or sell to outsiders. Both divisions can make use of outside market in case they are not satisfied with the offering of each other. Therefore, the application of market price approach demands sufficient divisional autonomy to meet the requirements of the competitive market. Where significant external selling costs (cost of credit sales, shipping and packing) exists, a transfer price may be set somewhat lower than market price to allow for cost savings on sales to inside buyers. The use of market prices has the following drawbacks:

- Since the selling of goods does not actually take place, it is a hard task to assume as to how the sale, if made, would affect the market price.
- Unfortunately, the application of market price as transfer price is not always possible as the products— components, materials or services—transferred between the divisions are not usually traded outside.
- In some cases, when a market does exist, it may be difficult to obtain an appropriate price as inside products are unique. In fact, a price is only compatible when the features—quality, finish and so on—of the products traded inside and outside are same.
- The market price that is available may not be truly representative.

Negotiated Pricing

If there is not enough of a market for the product, transfer price could be set by negotiation between the divisions. Negotiations can provide a valid transfer price if the following two conditions are satisfied

- existence of some type of outside market for the product; and
- divisional managers are allowed to make transactions in this market.

NOTES

In the absence of the above two conditions, any attempt to arrive at transfer prices could be futile in the sense that top management would settle this issue on the basis of a fair rate of return on investment. There is a danger that negotiations between the parties may lead to conflict within the companies if the parties concerned have equal bargaining power. Such a conflict would require protracted negotiations to resolve. At the same time, such situations demand some form of arbitration by top management so that divisional managers do not spend undue time on negotiations. One of the principal disadvantages of negotiated transfer price is that the protracted negotiations may divert managerial efforts away from the basic tasks.

Dual-rate Pricing

As its name implies, the dual-rate pricing suggests two pricing methods for transferred goods, *i.e.*, one for selling division and the other for buying division. The selling division records the sales at cost-plus price whereas the buying division records the transferred goods at variable costs only. Thus, this pricing method encourages both the selling division and buying division to make decisions regarding the optimal of the quantity. The dual-rate pricing seems rational but it is not widely used. Even the companies that have tried it have eventually discarded this practice (Eccles, 1983).

Illustration 14.3: You have been appointed as management accountant attached to the central office of the X & Y Ltd., with special responsibili-ty for monitoring the performance of the divisions within the company. Each division is treated as an investment centre. Summa-ries of the statement for division A and B, for the year ending 31st December 2012 are given below:

Particulars	***A* (₹)**	***B* (₹)**
Sales	7,00,000	9,50,000
Variable cost	3,20,000	4,10,000
Fixed overhead	2,00,000	2,90,000
Divisional assets	2,50,000	3,75,000

You are requested to assess the performance of the divisions with the help of ROI.

Solution

ROI = Assets turnover × Earning rate

Division A = 2.8 × 0.26 = 0.728

Division B = 2.53 × 0.26 = 0.657

Working:

(i) *Calculation of assets turnover*

$$\text{Assets turnover} = \frac{\text{Sales}}{\text{Assets}}$$

$$\text{Division A} = \frac{₹\ 7,00,000}{₹\ 2,50,000} = 2.8$$

$$\text{Division B} = \frac{₹\ 9,50,000}{₹\ 3,75,000} = 2.53$$

(ii) *Calculation of earning rate*

$$\text{Earning rate} = \frac{\text{Earnings}}{\text{Sales}}$$

$$\text{Division A} = \frac{₹\ 1,80,000}{₹\ 7,00,000} = 0.26$$

$$\text{Division B} = \frac{₹\ 2,50,000}{₹\ 9,50,000} = 0.26$$

(iii) **Division Profit Statement for the Year Ending 31st Dec. 2012**

Particulars	***A*** (₹)	***B*** (₹)
A. Sales	7,00,000	9,50,000
B. Variable cost	3,20,000	4,10,000
C. Divisional Contribution (A – B)	3,80,000	5,40,000
D. Fixed overhead	2,00,000	2,90,000
Divisional Profit (C – D)	1,80,000	2,50,000

Check Your Progress

1. What is the goal congruence objective of a performance evaluation system?
2. List the ways in which an investment centre can improve return-on-investment.
3. What are the conditions which must be satisfied for negotiations to provide a valid transfer price?

14.4 RESPONSIBILITY ACCOUNTING

Responsibility accounting is a system based on an organization's formal authority and responsibility relationship. In fact, it attempts to assign and match authority with responsibility. While narrating the nature and scope of responsibility accounting Needles et al. that responsibility accounting is an information system that classifies data according to areas of responsibility and reports each area's activities by including only the revenue, cost, and resource categories that the assigned manager can control. The basic philosophy of responsibility accounting is that performance of the managers should be measured in terms of such areas of activities for which they have been made responsible and over which they have significant degree of direct control.

Steps Involved in Responsibility Accounting

The analysis of nature of responsibility accounting reveals that it consists of the following steps:

- Division of an organization into various segments which are commonly known responsibility centres;
- Allotment of each responsibility centre to a particular manager who is held responsible for the performance of the particular centre;

NOTES

- Effective communication system to make possible the circulation of accounting information to various responsibility centres effective; and
- Corrective measures are taken in case of variances.

The concept of responsibility accounting can perhaps best be illustrated by comparing a conventional developmental operating statement with one under responsibility accounting (see Table 14.1). Under responsibility accounting, the foreman of the department does not see any expense figure over which he has no control. Specifically, he is probably not the one who makes decision on machinery purchases, and accordingly, depreciation on the machinery in his department is not considered as his responsibility. He is not responsible for the space occupied by his department. So no occupancy expenses are shown in his responsibility accounting statements. He is certainly not responsible for the amount of the factory superintendent salary and this item is, therefore, not allocated to the foreman's department. The same applies to watchman's salaries, elevator operator's wages, and similar costs. A second's thought will also indicate that he is not responsible for the amount of his own salary, which is, therefore, eliminated from the report. However, he is responsible for the salary of his assistant foremen, most of the indirect labour in his department, and variable costs such as materials, direct labour and variable overhead. The fixed and variable concept of cost control are still followed; the foreman's responsibility is to keep fixed expenses in line with a fixed budget and variable expenses in line with a standard or budgeted cost per unit produced or per standard direct labour hour.

Table 14.1 *Departmental Cost Reports under Conventional and Responsibility Reporting*

	Conventional Report			*Responsibility Report*		
	Actual (₹)	*Standard* (₹)	*Favourable (+)/ Unfavourable (–)* (₹)	*Actual* (₹)	*Standard* (₹)	*Favourable (+)/ Unfavourable (–)* (₹)
Direct material	76,400	73,500	(–) 2,900	76,400	73,500	(–) 2,900
Direct labour	1,36,800	1,24,200	(–) 12,600	1,36,800	1,24,200	(–) 12,600
Variable overheads: Salaries & Wages						
(i) Material handling	7,500	7,200	(–) 300	7,500	7,200	(–) 300
(ii) Overtime premium	2,900	3,800	900	2,900	3,800	900
(iii) Training	550	600	50	550	600	50
Power	2,400	2,700	300	2,400	2,700	300
Freight	23,800	22,000	(–) 1,800	23,800	22,000	(–) 1,800
Operating supplies	4,100	4,600	500	4,100	4,600	500
Expenditure tools	400	450	50	400	450	50
Total variable overheads	41,650	41,350	(–) 300	41,650	41,350	(–) 300
Fixed overheads: Salaries & Wages						
(i) General factory supervisions	1,000	200	(–) 200			
(ii) Foreman's salary	1,300	1,200	100			
(iii) Asstt. Foreman's salary	1,400	1,400		1,400	1,400	–
(iv) Watchman	450	375	(–) 75			
(v) Building maintenance	600	550	(–) 50			

NOTES

(vi) Equipment maintenance	1,200	1,300	100	1,200	1,300	100
(vii) Elevator operators	700	750	50			
(viii) Factory office	525	400	(–) 125			
Heat & light	1,000	800	(–) 200			
Fringe benefits	775	700	(–) 75	280	290	10
Depreciation—machinery	6,500	4,800	(–) 1,700			
Depreciation–building	1,400	1,100	(–) 300			
Insurance	800	850	50			
Property taxes	1,100	1,100	–			
Factory office expenses	450	500	50			
Total fixed overheads	19,200	16,025	(–) 2,575	2,880	2,990	110
Total overheads	60,850	57,375	(–) 2,875	44,530	44,340	(–) 190
Total departmental expenses	2,74,050	2,55,075	(–) 18,375	2,57,730	2,42,040	(–) 15,690

In most organizations, a factory superintendent is responsible for several foremen and the departments they operate. Under ordinary departmental reporting, the factory superintendent is responsible for controlling all the costs over which his subordinates have immediate jurisdiction. However, under responsibility accounting, his cost responsibility further includes costs for which his foremen are individually responsible. Such costs include the foremen's salaries and the salaries of persons who report directly to the factory superintendent because their work embraces a number of departments, for example, time keepers and time study personnel. Similarly, almost every factory executive will find that he himself, rather than a subordinate, is immediately responsible for certain costs. This is a fact of life that was not generally recognized in factory cost reporting until the advent of responsibility accounting.

Assumptions of Responsibility Accounting System

A sound responsibility accounting system is based on a number of assumptions, including (Heitger and Matulich, 1985):

- Managers held responsible for the activities over which they exercise control.
- Managers strive to achieve the goals and objectives that have been established for them and their part of the organization.
- Managers participate in establishing the goals against which their performance will be measured.
- Goals are attainable with efficient and effective performance.
- Performance reports and feedback are timely.
- The role of responsibility accounting in the company's reward structure is clearly stated.

Responsibility Centres

A *responsibility centre* is the unit of activity for which a manager is accountable to higher authority. It is a segment of an organization with reference to which information will be communicated to pinpoint responsibilities. In a broader sense,

the term responsibility centre implies the development of an organizational structure where there is identifiable responsibility for each cost, revenue and resource.

Types of Responsibility Centres

In a small business concern, a manager can personally supervize all decisions and their implementation. He has first-hand knowledge of each activity. However, as the business grows the manager can no longer directly supervise each event and transaction. Growing firms are subdivided into manageable and meaningful segments, departments or divisions. Each segment should have responsibility for a specific group of activities and its manager should be responsible for his decision affecting these activities.

Here the term responsibility centre is used in a broader sense. It could be as small as in individual machine or as large as the watch factory of HMT Limited. It could be a sales department in a departmental store, a service department, specific production line, a warehouse unit, or a group of salesmen. Size is not the criteria for development of a responsibility centre. The important criteria are:

- That a subdivision relevant to operating performance is separable and identifiable; and
- That there are relevant measures of performance.

For effective financial control, accounting experts usually classify responsibility centres into three classes:

- Cost centre
- Profit centre
- Investment centre.

Cost Centre: As mentioned in earlier units, a cost centre is the segment of the organization for which costs are accumulated and whose manager is accountable to the superior for costs incurred by the segment. A cost centre is any specified area of activity for which it is desired to accumulate cost data, and may be of any of the following types:

- *Production cost centre* such as assembly departments and finishing departments.
- *Service cost centre* such as personnel, accounting and utility departments that are necessary but not directly productive.
- *Ancillary manufacturing centres* such as those concerned with producing packing materials.

A cost centre may be created for cost control purposes whenever the management feels that the usefulness of accumulating costs for the activity in question justifies the necessary effort. A cost centre does not generate revenue directly. Certain criteria form useful guidelines in establishing the plan of organization that results in the best responsibility centre structure for control. The criteria include:

- Can one individual be held responsible for the entire performance of the responsibility centre?
- Is each cost centre clearly defined in terms of physical boundaries and responsibility for various inputs within that cost centre?
- Can product or service transfer points in and out of the responsibility centre be clearly stated?
- Is there no ambiguity about where the authority for activities lies among cost centres?
- Does the structure provide the best basis for planning operations and controlling performance in the plant, or would a finer or lesser fine breakdown of responsibility accomplish the job better?

The use of cost centre specifications can add importantly to the definition of responsibility centres. The specifications deal directly with documenting the application of the above criteria and assure adequate understanding of various executives of their responsibility for planning and control.

The performance evaluation of a cost centre is a difficult process. If not done carefully, the analysis of a cost centre may lead to the assumption that 'the best cost centre is the one that spends the least'. This attitude ignores benefits contributed by the cost centre to the overall business.

Profit Centre: Profit centre usually refers to a segment of an organization of which both the inputs and outputs are measured in terms of monetary units. It is a centre that generates income as well as incurs costs. The manager of the profit centre is responsible for the amount of profit earned by the centre. The profit centre is more sophisticated, in terms of management planning and control potential, than the cost centre where only costs are measurable. Since in the profit centre analysis both inputs as well as outputs are measured, assessment of its ability to earn a 'satisfactory profit' is possible.

The designing of a profit centre requires careful planning on the part of management. Factors like organization structure, nature of business, system of communication and efficiency of managers must be considered in identifying profit centres. However, the following criteria should be used to establish a profit centre (Heitger and Matulich, 1985):

- The organization must have two or more segments for which separate measures of revenue and expense are obtained.
- The management of these units must have considerable control over the segment expenses and revenues.
- Each segment's profit must be calculated and reported regularly to top management and results of this calculation must be considered by top management as part of its evaluation of the segment's performance.

Investment Centre: The investment centre is a centre where a manager is held responsible for both profit and the assets that are under his control. The investment made in each centre is separately ascertained and the profits or the ROI (Return on investment) is used as the basis for judging the performance of the employees. The various middle-level executives are supplied with ROI objectives and as they are making the requisite return on investment, they are given full freedom to take managerial decisions. Recognizing assets as a measure of capital investment, return on investment is worked out as under:

$$\frac{\text{Investment centre profit}}{\text{Investment centre assets}} \times 100 = \text{Return on investment (ROT)}$$

Thus, in an investment centre, performance is measured not only by net income earned by the centre but also by relating this net income to the assets investment. This concept allows an assessment of the efficiency of investment utilization. Investment centres are treated as individual businesses where the managers are responsible for all activities—costs, revenues and investments.

Responsibility Accounting Reports (Feedback Reports)

A well-designed responsibility accounting system must specify the type of feedback reports (control reports) to be prepared, their contents, format, and frequency of preparation and distribution. Responsibility accounting reports can be divided into four basic types (Chatfield and Neilson, 1983):

- Enumerative reports
- Analytical and interpretive reports
- Comparative and evaluative reports
- Problem-solving reports.

Frequency of Feedback Reporting

In addition to the form and content of responsibility reports, the management has to decide about their frequency and timing. The frequency of reporting is a function of the nature of the specified reports as well as its relative importance in aiding managerial decisions. However, feedback for evaluation and control should be prepared often enough so that timely controlled decisions are made at right time.

Controllability *vs*. Non-controllability

The value of the controllable/non-controllable cost split is primarily found in fixing responsibility and measuring efficiency. Time is an important ingredient in this context since all costs are controllable at some organizational level if a sufficiently long time span is taken. A cost should be controlled at whatever level it is originated and initially approved by the individual who did the initiating and approving. In this way, it will be clear that certain costs are the responsibility of the chief executive of a firm who alone can control such costs whereas others are controllable by responsible individuals at lower levels of the organizational hierarchy. For example, a departmental manager will be responsible for the salary expenses of those who work within his department and a foreman will be responsible for the cost of consumable materials used in his productive department. Strictly speaking, a foreman should only be held responsible for usage rather than prices as he does not have any control over the latter.

At this stage, however, it is important to distinguish between costs that are controllable at a given level of managerial authority within a given period of time and those that are not in order, that performance levels may be evaluated and the cooperation of managers at all levels secured.

Controllable cost is the cost that can be directly regulated by a given individual within a given time period. In the words of Horngreen controllable cost is *any cost that is subject to the influence of a given manager of a given responsibility centre for a given time span*. Soloman has cited the following three main situations in order to clarify the concepts about controllable and uncontrollable costs:

- The department is completely free to choose the quantity and source of goods or service.
- The department is not free to choose the source of the goods or services but is free to decide upon the quantity taken.
- The department is not free to choose either the source or the quantity of the goods or services taken.

The analysis of the above situation clearly shows that in the first context the costs are fully controllable whereas in the second situation the quantity factor of the cost is controllable without any control over price factor. However, costs are non-controllable in the given circumstances in the third case.

Costs are also categorized into direct and indirect costs. Indirect costs are treated as uncontrollable costs whereas direct costs are treated as controllable costs. However, direct cost cannot always be controllable, for example, the depreciation of a plant is a direct cost of the department that uses the plant but this cost is determined by company policy rather than by the head of the division and can, therefore, be regarded as an uncontrollable cost at this level. Thus, the division of costs into controllable and uncontrollable categories is a difficult task. However, the following guidelines are suggested by Wilson for this purpose:

- If an individual has authority over both the acquisition and the use of a cost incurring activity, then his responsibility centre should bear the cost of that activity.
- If an individual does not have sole responsibility for a given cost item but is able to influence to a significant extent the amount of cost incurred through his own actions, then he may reasonably be charged with the cost.
- Even if an individual cannot significantly influence the amount of cost through his own direct action, he may be charged with a portion of those elements of cost with which the management wishes him to be concerned in order that he may help influence those who are more directly responsible.

Advantages of Responsibility Accounting

Responsibility accounting is becoming more and more popular as an aid in cost control day by day. Costing experts claim that cost control can only be effective if individuals are held responsible for the costs over which they have authority. In addition, the introduction of responsibility accounting offers the following benefits to a firm:

- It helps in assigning responsibility to a specific individual in the organization.
- It facilitates the identification of satisfactory and unsatisfactory performance of different individuals by evaluating a job-wise total (monthly and annual) performance.
- It assists in cost planning by making available relevant and up-to-date information to the decision makers.
- It improves profitability of the concern by taking timely corrective action.
- It satisfies the twin objectives of management-delegating authority while retaining overall control.
- It contributes to the growth and prosperity of the business even in the face of adverse factors in the external economic environment.
- It improves individual performance by motivating one to act in the best interest of the enterprise.

Problems in Responsibility Accounting

The introduction of responsibility accounting may cause the following problems for the enterprise:

- Clear cut distinction between the controllable and uncontrollable—a basic requisite for efficient responsibility accounting system is practically a difficult process.
- The responsibility centre may act in the best interest of its own, but not in the corporate interest. This situation demands the effort on the part of the management to bring harmonization and coordination between different segments of the enterprise.

- The preparation of responsibility accounting reports is not an easy job. Measures should be taken to avoid irrelevant information.
- The preparation of feedback report may consume some time and till a report is submitted to the management for corrective action, the problem might have further deteriorated.

The above-mentioned problems cannot make responsible accounting system unproductive. However, the management has to take all necessary measures to overcome the problems in order to make the system of responsibility accounting effective and efficient.

14.5 INFLATION ACCOUNTING

During inflationary period, it may not be a rational attempt to present the financial statements on historical cost basis and attract the attention of accountants and professionals. This situation demands the adjustment of historical accounting in the light of price level changes which is known as *inflation accounting*. To the author of this book, *inflation accounting is an accounting technique which aims to record business transactions at current values with an objective to neutralize the impact of changes in the prices on the business transaction*.

Factors Leading to the Problem

The basic factors responsible for causing distortions in the historical cost accounts are:

- adoption of historical cost for fixed assets and depreciations;
- adoption of historical cost instead of current values for inventories; and
- recording of other items of assets and liabilities without regard to their current values.

Due to the above-listed factors, the financial statements become difficult to interpret. They tend to provide inaccurate and misleading information to the stakeholders, particularly to the management and the shareholders who find it difficult to judge the operating efficiency of the enterprise.

Issues in Inflation Accounting

At present, inflation accounting is one of the most significant, challenging and controversial topics in the field of accounting. Many issues relating to inflation accounting are debatable that require further discussion and research. However, it would be worthwhile to discuss here few important issues in inflation accounting because such an attempt would help in the identification of appropriate technique and/or method of inflation accounting.

Historical Cost Accounting *vs*. Inflation Accounting

In the early days of inflation accounting development, there was a controversy on the issue whether firms need to adjust historical cost accounts for price level changes. With time, the tempo of inflation increased tremendously and businessmen started to realize the importance of inflation accounting. Hence, at present, a good number of accountants and researchers are in favour of such adjustments in financial statements.

Adjustment Items

There are two approaches for the adjustment of items. According to one group of experts, a sound inflation accounting system must cover the adjustment of all financial items. The second group recommends to adjust only those items that have direct impact on financial results. However, the first approach is more logical and scientific one.

Use of Index Number

The opinion of experts quite differs with each other on the use of index numbers. For the adjustment of financial accounts, firms can use either *general purchasing power index* or *specific index number*. Most experts recommend to use general purchasing power index for this purpose on the following facts:

- It replaces the monetary unit of measurement which ceases to be stablize during the changing price level. In this connection, Staubus states,

Common unit accounting is intended to make all monetary amount appearing on any one financial statement and on any articulated set of financial statements presented at any time, comparable in terms of purchasing power . . . . A 'scale adjustment' for changes in our measuring instrument—the monetary unit—must be made in order to achieve purchasing power compatibility of measurements made at different times under inflationary conditions.

- It provides a uniform measuring rod.
- It provides a tool for comparison of diverse resources. Commenting on this issue Rosenfield is of the opinion,
- *Individuals or enterprises often wish to compare collections of resources. For example, a person may wish to compare his present stock of resources with his stock a year previous or with his anticipated stock in the subsequent year hence or he may wish to compare his resources with the resources of others.*
- *Comparisons are complicated because resources are diverse—money is used as the standard of comparison in more specialized economies. Collection of resources are compared based on their relationship to units of money.*

- *Money is used as the standard because it is accepted widely in exchange for other resources and, therefore, be readily related to them. But money has a defect that makes it less than ideal as a standard: the general purchasing power of money—its command over goods and services in general—is notoriously fickle. An increase in money may not indicate an increase in general purchasing power. General purchasing power itself is a resource that is widely prized, and general purchasing power may be used as the standard to compare diverse resources to overcome the defect of money as the standard.*
- It advocates its use for restating assets as well as shareholder's capital.
- It presents information to the proprietors, showing how their funds have been utilized and the profit derived from such use.
- Despite of the above-mentioned reasons, general purchasing power cannot be applied with reasonable amount of accuracy to any other entity.

Techniques of Inflation Accounting

To address the implications of inflation on business, the scholars have developed a number of techniques and the important among them are:

- Current purchasing power method (CPP);
- Replacement cost accounting method (RCA);
- Current value accounting method (CVA); and
- Current cost accounting method (CCA).

Current Purchasing Power Method

Current purchasing power method commonly known as CPP method has been recommended by many professional institutes for adjusting financial statement during inflationary period. Under this method, the business records the transactions with help of financial accounting system—conventional historical cost basis. However, it further suggests to prepare supplementary statement at the end of the accounting period showing all the items of the financial statement in terms of the value of rupee as at the end of the period to which they relate. The main features of current purchasing power method are:

- The financial statements, *i.e.*, profit and loss account and balance sheet must be prepared on the basis of historical costs. The conventional financial statements of a firm must be attached by a supplementary statement which must indicate changes in the financial conditions of the concern during the financial period as a result of changes in the purchasing power of money.
- The conversion of figures in the basic financial statements into the figures in the supplementary statement should be made with the use of General Price Index*. For this purpose either Consumer Price Index or Wholesale Price Index published by the Reserve Bank of India can be used. The items of

financial statement are converted into current purchasing power with the use of following formula:

$$CPP = \frac{CPI}{PPI} \times CA$$

Where

CPP = Current purchasing power; CPI = Current general price index;

PPI = Previous price index; and CA = Conversion amount.

Illustration 14.4 Compute the current purchasing power of a land in 2012 from the information given below:

Cost of the land (purchased in 2007)	₹ 3,00,000
General Price Index in 2007	120
General Price Index in 2012	200

Solution

$$CPP = \frac{CPI}{PPI} \times CA$$

$$CPP = \frac{200}{120} \times 3,00,000 = 5,00,000$$

The financial accounts must be classified into two major categories namely, monetary and non-monetary. *Monetary accounts* represents such balance sheet items the values of which do not change with a change in purchasing power of money because the monetary value of such items is fixed by contract or otherwise. The best examples of such items are cash, bills receivable/payable, debtors/creditors, outstanding incomes/expenditures etc. On the other hand, *non-monetary accounts* are such items of balance sheet, the values of which are subject to change with the change in the purchasing power of money such as stock, plant, building, land, furniture, etc. The second category, *i.e.*, non-monetary accounts should be restated in the supplementary statement in the light of change in the purchasing power of the rupee whereas no such adjustment should be made for monetary items.

Limitations of CPP Method Current purchasing power suffers from the following limitations:

- The concept is somewhat theoretical. Being statistical average, the index numbers cannot be used with precision to individual firm.
- The selection of particular index number is a difficult job as different price situations demand different price index numbers.

- The preparation of adjusted financial statement is a costly and time-consuming process and as such small concerns may not afford to have such reproduction of accounts.
- The exclusion of monetary accounts cannot give a true picture about the financial state of the company.
- This method cannot be suitable for the purpose of taxation as the tax authorities accept only historical accounts.
- It may further distort the picture if the price indices used are not accurate ones.
- Despite the above weaknesses, the current purchasing power method is theoretically sound. Many foreign firms have introduced this method on an experimental basis and it has been observed that the method can be used with considerable ease.

Replacement Cost Accounting Method

In order to remove the limitations of the current purchasing power, another method known as the Replacement cost accounting (RCA) method was developed. Replacement cost accounting has received considerable attention in the past few decades as an approach that may provide a direct attack on resolving financial reporting problems that arise during periods of rapidly changing prices. It emphasizes the need to create sufficient provision in the profit and loss account which should be adequate to meet the requirements of the fixed asset replacement programme of the concern. Thus, the charges to profit and loss account are governed by the replacement cost rather than depreciation cost of the asset. Likewise, the reporting amount of each expense should be the amount of rupees required at the time of expenses incurred to replace the resources consumed. For example, a firm sold product 'A' on 3 June 2012 for ₹ 7,000. The product 'A' was acquired by the firm on 12 April 2012 for ₹ 4,000. Also, suppose that on 3 June 2012 at the time of sale, the cost to replace product 'A' was ₹ 5,500. Under replacement cost accounting system, the above-mentioned transaction will appear in income statement as sales ₹ 7,000 less cost of goods at ₹ 5,500. In more general terms this means that when an asset is acquired some time prior to its expiration, the historical number of rupees paid for the asset is likely to differ from its replacement cost at the time of the expense incurrence (asset expiration). The replacement cost accounting requires that the reported amount of expenses be measured at the time of the asset expiration.

The logic of expressing expenses in terms of replacement cost is that any income that appears in the profit and loss account is matched with the current (at the time of the sale) cost of the resources which were used to earn that revenue. Thus, operating profits is not positive unless incomes are sufficient to replace all of the resources that were consumed in the process of producing those incomes.

The operating profit figure is, therefore, thought to be an important (and improved) basis for evaluating the effectiveness of operating activities.

Further, under replacement cost accounting method, all of the non-monetary items must be reported in the balance sheet at their respective replacement cost as on the balance sheet date.

The main difference between RCA and CPP is of the index used for conversion. Replacement cost accounting method suggests the use of such indices which are directly relevant to the company's particular financial time rather than the General Price Index as used in CPP. This would mean the use of a number of price indices by a business concern for the conversion of the items in financial statements which is a difficult task.

Current Value Accounting Method

To make financial statement more useful, some accountants have advocated the adoption of current value (or fair value) accounting as a substitute for historical cost-basis accounting. Under current value accounting method all items of balance sheet are shown at their current values. It is a concept wherein net assets at the beginning and at the end of the accounting period are ascertained and the difference is regarded as the profit/loss for the period. Thus, current value accounting attempts to reflect economic reality in the financial statement by using current values to account for various items of balance sheet. However, the determination of relevant current value is a difficult task. It involves an element of subjectivity.

Current Cost Accounting Method

To study the problem of price level changes, the British government appointed a committee in 1973 under the chairmanship of Mr. Francis C.P. Sandilands. The Committee known as Sandilands Committee had to investigate about various issues relating to price level changes and had to recommend the appropriate inflation accounting. This committee after about 17 months of continuous research submitted its report on 25 June 1975 and recommended the current cost accounting (CCA) technique as a base for financial reporting in place of CPP or RCA techniques. According to the Committee, the RCA technique is only one of principal system of value accounting and CPP may be used in conjunction with either historical costs or value accounting. The Committee considered CCA as a comprehensive technique of accounting for inflation. Under the CCA method, a company's annual accounts will include:

- profit and loss account;
- appropriate account;
- statement of the change in the net equity interest after allowing for the change in the value of money.

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The basic principles of current cost accounting techniques are:

- Money is the unit of measurement.
- Assets and liabilities are shown in the balance sheet at their current values and not on historical costs.
- Revenue should be charged with the depreciation of fixed assets calculated on their value to the business.
- The cost of inventory consumed should be valued at their replacement cost at the date of sale.
- Revaluation surpluses arising out of revaluation of fixed assets should be transferred to revolution reserve account.

Inflation Accounting in Indian Companies

The Indian Companies Act has made it obligatory for the companies in India to prepare their financial statements on the basis of historical costs. But at the same time, the Act has not in any way restricted companies not to maintain inflation accounting system. It is feasible for the Indian companies to deal with the inflationary problems with the use of supplementary statements in support of historical financial statements till an amendment is made in the present provisions of the Act. Thus, under present circumstances, the current purchasing power (CPP) technique is the suitable approach for this purpose.

In this connection, attempts have already been made by few Indian companies such as Tube Investment of India Ltd., Carborundum Universal Ltd. and Ashok Leyland Ltd. However, the efforts so far made in India in this connection are in no way sufficient. It needs a continuous research and debate on inflation accounting. To formulate appropriate accounting system capable of dealing with the problem of price-level changes in India, the government must set up a working committee for this purpose. The said committee must constitute members from various areas of trade and commerce such as professional accountants, financiers, trade union leaders, academicians, management consultants, etc.

Advantages of Inflation Accounting

There cannot be two opinions about the adjustments of financial statements in the light of price-level changes. At present, almost every professional accountant and researcher is in favour of such adjustments in historical statements. According to them, an enterprise can be benefited in a number of ways by employing inflation accounting. The important among them are:

- It gives accurate picture of profitability by matching current revenues with current costs.
- It keeps the capital of the enterprise intact by stopping payments of dividends and taxes out of its capital as is done under historical accounting.

- It depicts the true and fair view of the financial position of a concern as current values of the items are considered in the preparation of balance sheet.
- It makes possible the profitability comparative study of the enterprises set up at different periods.
- It helps the enterprises to replace the assets when required with more ease as depreciation is charged on the current value of the assets.
- It can satisfy the social obligation of the business in its real spirit by providing accurate financial information to the various interested parties.
- It helps the company to have realistic price for its shares in the investment market.

Disadvantages of Inflation Accounting

The inflation accounting suffers from the following limitations:

- Inflation accounting is a complicated, confusing and time-consuming process as it requires a heavy work of calculations and adjustments.
- A non-accounting person fails to understand, analyse and interpret the adjusted financial statements.
- It can make the information disclosed by financial statements more inaccurate if proper conversion method is not adopted. Normally people may convert the items on the basis most suited to them.
- This system is not suitable for income tax purposes as the depreciation charged on current values of fixed assets is not allowed under the Income Tax Act, 1961.
- It is a continuous process that involves constant adjustments in the financial statement.
- Profits are overstated under this method during deflation as lesser depreciation will be charged to fixed assets.

Illustration 14.5 Mr Smart sold shares of XY Co. Ltd. in 2012 for ₹ 3,00,000 which he had acquired for ₹ 1,25,000 in 2005. The General Price index in 2005 and 2012 was 90 and 150 respectively. Calculate the business result from the sale of shares under CPP accounting .

Solution Cost of acquisition of shares ₹ 1,25,000 in 2005. Sale proceeding of shares ₹ 2,00,000 in 2012. Under historical accounting it seems that Mr Smart has earned a profit of ₹ 75,000 (2,00,000 – 1,25,000) from the sale of the shares. However, the picture is quite different under CPP accounting as is clear from the calculation below:

$$CPP = \frac{CPI}{PPI} \times CA$$

$$CPP = \frac{150}{90} \times 1,25,000 = ₹\ 2,08,333$$

NOTES

Less: Sale proceeding of shares of 2012 = ₹ 2,00,000

Loss from sale of shares = ₹ 8,333

Illustration 14.6 Compute from the following transaction the loss of purchas-ing power on account of price level changes:

Date	*Particulars*	*Amount*	*Price Index*
1st January	Opening balance	1,000	100
15th January	Sale for cash	3,150	105
15th January	Disbursement of cash	2,100	105
31st January	Closing balance	2,050	110

Solution

Statement of Cash

Particulars	*Historical Accounting (₹)*	*Conversion Factor*	*Converted Values/Expected Amount (₹)*
(a) Opening balance	1,000	110/100	1,100
Sale of cash	3,150	110/105	3,300
	4,150		4,400
(b) Disbursement of cash	2,100	110/105	2,200
Closing balance (a – b)	2,050		2,200

Thus holding profit/loss = (Actual balance – Expected balance)

= (2,050 – 2,200)

= ₹ 150 (loss)

Check Your Progress

4. What are responsibility centres?
5. State the two approaches for adjustment of items in inflation accounting.
6. Mention the difference between CPP and RCA methods of inflation accounting.

14.6 HUMAN RESOURCES ACCOUNTING

Human resource accounting (HRA) is a term used to describe a variety of proposals that seek to report and emphasize on the importance of human resources—knowledgeable, trained and loyal employees in a company's earning process and

total assets (Davidson, 1974). Different authors have defined HRA differently. The particular form reflects the preoccupations of individual authors. Most have certain basic features in common, especially the notion of looking at the system from the point of view of the business investment. Others' definitions place their emphasis on the reporting objective. This can be seen in the following definition put forward by the *American Accounting Association* (AAA) (1973): *The process of identifying and measuring data about human resources and communicating this information to interested parties.*

A complementary but more directive approach is adopted by Knauf who defines HRA as:

> *The measurement and quantification of human organizational inputs, such as recruiting, training, experience and commitment.*

Commenting on the concept of HRA, Flamholtz states:

> *Accounting for people is an organizational resource. It involves measuring the costs incurred by business firms and other organizations to recruit, select, hire, train and develop human assets. It also involves measuring the economic values of people to organizations.*

To the author of this book, HRA *is a system devised to assess and communicate the value of human resource of an organization. The impact of human resource on the affairs of business has to be reflected in firm's financial statements.* Thus, the process of HRA involves the following steps:

- measurement of investment in human resource;
- recognition and identification of investment in human resource; and
- reporting of such an investment in the financial statements.

Objectives of HRA

The major objectives of HRA are to:

- provide management relevant and sufficient information about human resource to help it in decision making;
- help the management in measuring returns on the investment made in human resource;
- measure the performance of human resource and communicate the same to management;
- help management in manpower planning; and
- ensure matching expenditures against relevant incomes.

Advantages of HRA

Human resource accounting (HRA) as an indispensable segment of modern accounting helps management in the following ways.

- It helps management in the identification and analysis of various human problems at the job.

- Since HRA recognizes human resource as an asset and reflects the same in the balance sheet of an organization, therefore, it acts as a psychological impetus for its employees to improve their performance.
- Management finds it easy to exercise a choice between different alternatives as HRA presents essential information on human resources and changes in their value during a particular period.
- HRA ensures effective use of human resources by helping the management in their planning and control.
- The problem of allocation of human resources is solved to a large extent by HRA as it helps management in the quantification of such variables that govern the decision of allocation.
- HRA helps management in determining profitability and productivity. By showing human resource as an asset in the financial statement, it provides a measure of productivity.
- HRA makes possible the realistic assessment of return on investment as it considers investment on human resources in it.
- HRA is useful to investors as it helps them to study properly the value of a firm. It provides them the assessment regarding the quality of human resources available to the firm.

Limitations of HRA

The following are the major limitations of HRA:

- The ownership of human resource is practically impossible, therefore, it cannot be considered at par with other assets.
- The measurement of human resource is subjective as different firms will use different methods for this purpose. Till date there is no model for valuation which is widely accepted and used.
- It is not economical for small business units as it involves heavy costs.
- The concept of HRA is not recognized by tax authorities, and therefore, it has only academic utility.
- There is no specific objective procedure for the selection of the factors to be included in the valuation of human resource, and therefore, the subjective approach of the valuator in this regard makes it less reliable.

Methods of Human Resource Valuation

Historical Cost Method

Historical cost method developed by Rensis Likert and his associates, was adopted by R. G. Barry Corporation, Ohio Colombia, USA in 1968. This method based on conventional accounting involves capitalization of the costs incurred on the

development of human resources because such resources are expected to yield benefits beyond the current accounting period. Thus, the amount actually spend on recruitment, selection, placement, training and learning, which determines the investment in the human asset, is accumulated and amortized annually over the expected length of services of the employees. The unexpired cost—the amount yet to be amortized—represent the amount of firm's investment in the human resources. In case the employee leaves the organization before the expiry of the life period of the expected services, the firm would write off the entire amount of unexpired cost against the revenue of the period in which he leaves.

Replacement Cost Method

Replacement cost method as an alternative method for Historical Cost Method was initially developed by Hekimian and Jones. According to them, the value of a firm's human resource is the replacement cost of such resource. In the opinion of Flamholtz, *the value of human resource involves two forms of replacement cost—Individual Replacement Cost* and *Positional Replacement Cost*. The former refers to the cost incurred by a firm to replace an employee with an equivalent substitute in terms of skill, ability and knowledge whereas the latter refers to the cost of replacing the set of services expected to be rendered by an employee at the respective positions he holds and will hold at present as well as in future. Thus, under this method, the human resource investment shall appear in the balance sheet at replacement cost of human resource instead of historical costs.

Opportunity Cost Method

In order to overcome the limitations of replacement cost method, Hekimian and Jones suggested the use of opportunity cost method which determines the value of human resource on the basis of an employee's value in alternative uses. Accordingly, the value of an employee is based on his opportunity cost—the price of other divisions are willing to pay for the service of an employee working in another division of an organization. Thus, the value of an employee would be high if he has several alternative uses for deployment in the various divisions of an enterprise. This brings to light an important fact that the opportunity cost is linked with scarcity. This approach determines the value of human resources by establishing competitive bidding within an organization.

Capitalization of Salary Method

The advocates of this method Baruch Lev and Aba Schwartz have used the concept of human resources in terms of economic value in this model. According to them, the salaries payable to employees during their stay with the organization may be used as a surrogate for the value of human resources, in view of the close correlation between employees' compensation and their value to the organization. Thus, the value of human resources is the present value of future earnings of a homogeneous group of employees. The application of this method involves the following steps:

- Division of employees into homogeneous groups. The bases of employees' division include their age, designation, skill and task;
- Determination of the average annual earnings for each group of employees; and
- Calculation of the present value of the total earnings of each class of employees with the help of an appropriate discount rate.

The authors of the model recommend the following formula to measure human resource.

$$vr = \sum_{t=r}^{T} \frac{I(t)}{(1+r)^{t-r}}$$

Where, v = The human capital value of a person r years old,

T = The person's retirement age,

I(t) = The person's annual earnings upto re-tirement,

r = A discount rate specific to the person.

Economic Valuation Method

Economic valuation method considers the present worth of the employees' future service expected to be derived during their stay with the organization as the value of a firm's human resource. Although there seems to be some resemblances between earlier model, *i.e.*, capitalization of salary method and this model, yet they differ with each other. The economic valuation model recommends the capitalization of employees' service whereas under capitalization of salary method the employees' salaries are capitalized. According to the economic valuation method, the value of human resources is determined on the basis of the expected services of the employees in each service state that they may occupy during their association with the organization. Under this method, the valuation of human resources involves the following steps:

- Estimation of employees' future services;
- Multiply the first step by the employees' rate of pay;
- Multiply the second step by the rate of return on investment. This would give the present worth of employees' services.

The major problem in the application of this method is the quantification of the benefits that an organization expects to derive from the future services of its employees.

Return on Efforts Employed Method

This method measures the value of a firm's human resources on the basis of efforts made by individuals for organizational benefits. These efforts are evaluated in the light of the following factors:

NOTES

- Positions an employee holds;
- Degree of excellence an employee achieves; and
- Experience profile of the employee.

The above-mentioned factors are used to measure both individual and group efforts.

Adjusted Discounted Future Wages Method

Hermanson developed this model wherein he recommends to measure the value of human resources on the basis of relative efficiency of an organization in the industry. This model relates the value of human resource with the extra profit the firm earns over and above the industry expectations. In fact, this model attributes the differences in profitability rates between firms of an industry to the varying efficiency of their human resources. It is with this argument that Hermanson suggests to measure the value of human resources on the capitalized value of the excess future profits realized by a firm. Accordingly, the valuation of a firm's human resources involves the following steps:

- Estimation of wages and salaries to different levels of employees for the succeeding five years.
- Calculation of the present value of the wage and salary payments at the rate of return which is considered normal in the industry.
- Determination of an average efficiency ratio* for a specified period, usually the previous five years.
- Calculation of the present value of future services of the firm's human resources. This is worked out by multiplying the discount value (second step) by the firm's efficiency ratio (third step).

Reward Valuation Method

As an improvement over the capitalization of salary method, Flamholtz[13] developed a model commonly known as Stochastic Rewards Valuation Method. The method seeks to measure the value of human resources on the basis of an employee's value to an organization at various service states (roles) that he is expected to occupy during the span of his working life with the organization. The author has identified the major variables which determine the value of an individual to a firm. In the context of this model the assessment of an employee's value involves the following steps:

- Estimation of an employee's expected service life;
- Identification of set of service states (roles) that an employee may occupy during his service life;
- Estimation of the value derived by the organization at a particular service state of a person for the specified time period;

- Estimating the probability that a person will occupy at possible mutually exclusive service state at specified future times;
- Determining the total value of the services derived by the organization from its employees; and
- Discounting the total value (*fifth step*) to its present value at a pre-determined rate.

Check Your Progress

7. How does HRA act as a psychological impetus for its employees to improve their performance?
8. Name the method of human resource valuation as per which the value of human resources is the present value of future earnings of a homogeneous group of employees.

14.7 ANSWERS TO CHECK YOUR PROGRESS QUESTIONS

1. The goal congruence objective of performance evaluation system attempts to bring a harmony between the divisional goals and corporate goals.
2. An investment centre can improve return-on-investment by three ways, viz., increasing sales volumes, reducing expenses and reducing assets.
3. Negotiations can provide a valid transfer price if the following two conditions are satisfied:
   - Existence of some type of outside market for the product; and
   - Divisional managers are allowed to make transactions in this market.
4. A responsibility centre is the unit of activity for which a manager is accountable to higher authority.
5. There are two approaches for the adjustment of items. According to one group of experts, a sound inflating accounting system must cover the adjustment of all financial items. The second group recommends to adjust only those items that have direct impact on financial results.
6. The main difference between RCA and CPP is of the index used for conversion. Replacement cost accounting method suggests the use of such indices which are directly relevant to the company's particular financial time rather than the General Price Index as used in CPP.
7. Since HRA recognizes human resources as an asset and reflects the same in the balance sheet of an organization, therefore, it acts as a psychological impetus for its employees to improve their performance.

7. It is the Capitalization of Salary method of human resource valuation as per which the value of human resources is the present value of future earnings of a homogeneous group of employees.

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14.8 SUMMARY

- Divisionalisation is a process of dividing an organization into divisions on the basis of its profit-making activities. Each division is put under the control of a manager who is responsible for both the output of the division and the resources expanded in attaining that output.
- The specific objectives of a divisional performance evaluation system are: goal congruence, motivation and feedback.
- Popular approaches to measure performance of a division are variance analysis, contribution margin, net profit, return on investment; and residual income.
- Transfer price is the intra-company price at which goods and services of a profit centre are sold to another responsibility centre within the same company. Under actual or full cost pricing, the transfer price represents accumulated cost of goods that are being transferred.
- Methods of transfer pricing include cost-based pricing, market-based pricing, negotiated pricing and dual-rate pricing.
- Responsibility accounting is an accounting process that holds a manager responsible for those items which are directly under his control. It is a system of recording costs and revenues where each manager is assigned only those factors that he can affect by his decision.
- For effective financial control, accounting experts usually classify responsibility centres into three classes: cost centre, profit centre and investment centre.
- Inflation accounting is an accounting technique which aims to record business transactions at current values with a purpose to neutralize the impact of changes in the prices on the business transactions.
- There are two approaches to the adjustment of the items. (i) The opinion of experts quite differs with each other on the use of index numbers, (ii) The majority of experts recommend use of general purchasing power index for the adjustment of a firm's financial accounts.
- Techniques of inflation accounting include current purchasing power method, replacement cost accounting method, current value accounting method and current cost accounting method.
- Human resource as an essential input for the growth and prosperity of a business is recognized all over the world.

- HRA is a system devised to assess and communicate the value of human resource of an organization.
- Methods of human resource valuation include historical cost method, replacement cost method, opportunity cost method, capitalization of salary method, economic valuation method, adjusted discounted future wages method and reward valuation method.

14.9 KEY WORDS

- **Divisional performance appraisal:** It refers to a system that is used to measure and assess the performance of the divisions of a company.
- **Transfer price:** It is the intra-company price at which goods and services of a profit centre are sold to another responsibility centre within the same company.
- **Responsibility accounting:** It is a system based on an organization's formal authority and responsibility relationship.
- **Inflation accounting:** It is an accounting technique which aims to record business transactions at current values with an objective to neutralize the impact of changes in the prices on the business transactions.
- **Human resources accounting:** It is a system devised to assess and communicate the value of human resource of an organization.

14.10 SELF ASSESSMENT QUESTIONS AND EXERCISES

Short Answer Questions

1. What are the cost-based pricing methods of transfer pricing?
2. List the drawbacks of the market-based pricing in transfer pricing.
3. What are the specific objectives of a divisional performance evaluation system?
4. Write a short note on the steps involved and assumptions of responsibility accounting system.
5. What are the factors leading to distortions in the historical cost accounts?
6. Briefly explain the steps involved and the objectives of HRA.
7. Write a short note on the advantages and limitations of HRA.

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Long Answer Questions

1. Describe the popular approaches to measure the performance of a division.
2. Examine the concept of responsibility centres and its types.
3. Discuss the advantages and problems in responsibility accounting.
4. Explain the techniques of inflation accounting.
5. Discuss the advantages and disadvantages of inflation accounting.
6. Examine the methods of human resource valuation.

14.11 FURTHER READINGS

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